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TITLE: CONTACTLESS IC CARD WITH DISPLAY FUNCTION AND  
HOTEL  
SERVICE SYSTEM USING THIS IC CARD  
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ABSTRACT:

PROBLEM TO BE SOLVED: To obtain a hotel service system using a contactless IC card with display function and the contactless IC card used in this system.

SOLUTION: The hotel service system makes a customer carry a contactless IC card 10 with display function to offer services of a hotel, and the contactless IC card with display function is provided with a function (1) as a customer room key, a cashless adjustment function (2) in shops and restaurants in the hotel and tied-up shops and equipment on the outside of the hotel, a reservation display function (3) for auxiliary and tied-up equipment and tied-up traffic facilities, and a service point management display function (4) for purchase and the amount of used money on the inside and the outside of the hotel. The contactless IC card 10 with display function is suitably used by adopting a recordable and erasable magnetic recording part as the display part

or adopting a rewritable thermal recording display part as the display part.

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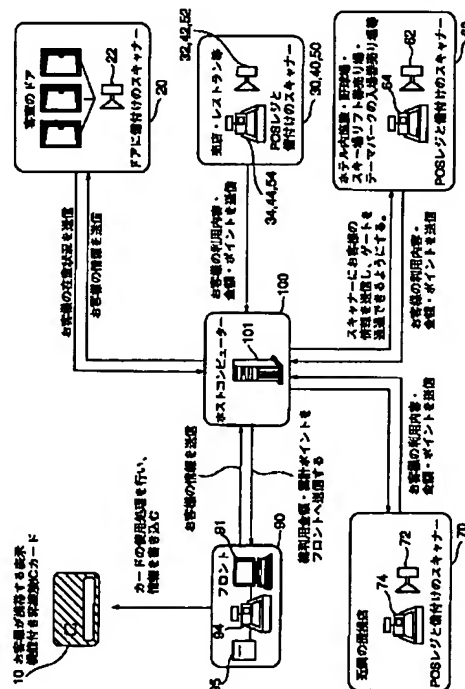
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(54) 【発明の名称】 表示機能付き非接触ＩＣカードを利用したホテルサービスシステムと表示機能付き非接触ＩＣカード

(57) 【要約】

【課題】 表示機能付き非接触ＩＣカードを利用したホテルサービスシステムとそれに使用する非接触ＩＣカードを提供する。

【解決手段】 本発明のホテルサービスシステムは、お客様に表示機能付き非接触ＩＣカード１０を携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ＩＣカードが、①客室ルームキーとしての機能と、②ホテル内売店・レストラン、ホテル外提携店、提携施設におけるキャッシュレス精算機能と、③付属および提携施設、提携交通機関における予約表示機能と、④ホテル内外の購買・利用金額に対するサービスポイント管理表示機能と、を有することの特徴とする。また、本発明の表示機能付き非接触ＩＣカードは、表示部を記録、消去可能な磁気記録部とするか、書き換え可能な熱記録表示部とすることにより好適に使用することができる。



## 【特許請求の範囲】

【請求項1】 お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、

①客室ルームキーとしての機能と、②ホテル内売店・レストラン、施設およびホテル外提携店、提携施設におけるキャッシュレス精算機能と、③付属および提携施設、提携交通機関における予約表示機能と、④ホテル内外の購買・利用金額に対するサービスポイント管理表示機能と、

を有することを特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム。

【請求項2】 お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが情報記録部と情報表示部とを有し、

①情報記録部には、カード識別ID、お客様氏名、客室ナンバー、ホテル内売店・レストラン、施設、ホテル外提携店、提携施設での購買・利用金額やそれらの合計金額、購買・利用金額に対するサービスポイントおよびホテル内外施設や提携交通機関の予約内容が記録されることと、

②情報表示部には、客室ナンバー、ホテル内売店・レストラン、ホテル外提携店、提携施設での購買・利用金額やそれらの合計金額、購買・利用金額に対するサービスポイントおよびホテル内外施設や提携交通機関の予約内容がリーダライタにより書き込み表示されること、を特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム。

【請求項3】 お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、

①表示部に客室ナンバーを表示することと、

②当該非接触ICカードを上記客室ナンバーのドアスキャナーに接近させることにより、客室ドアロックが解除されることと、

③お客様の入室状況がホストコンピュータに送信されて記録されること、

を特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム。

【請求項4】 お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、

①記録部にホテル内外での購買や施設、提携交通機関の利用時における購買・利用内容とその金額とそれらの合計金額および購買・利用に対するサービスポイントがスキャナーまたはPOSレジスタを通じて逐次記録されることと、

②表示部にホテル内外での購買や施設、提携交通機関の利用時における購買・利用金額とそれらの合計金額およ

び購買・利用金額に対するサービスポイントがリーダライタにより書き込み表示されることと、

③ホテル内外での購買や施設の利用時における購買・利用金額とそれらの合計金額がホストコンピュータに送信されて記録されることと、

④当該ホストコンピュータの記録データによって、チェックアウト時における料金の精算が行われること、を特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム。

10 【請求項5】 お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、

①記録部にホテル内施設やホテル外提携施設、提携交通機関の利用予約が記録されることと、

②表示部にホテル内施設やホテル外提携施設、提携交通機関の利用予約が表示されることと、

③ホテル内施設やホテル外提携施設、提携交通機関の利用内容とそれらの合計金額がホストコンピュータに送信されて記録されることと、

20 ④当該ホストコンピュータの記録データによって、チェックアウト時における料金の精算が行われること、を特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム。

【請求項6】 請求項1から請求項5記載のホテルサービスシステムに使用する表示機能付き非接触ICカードであって、非接触でデータの送受信を行う機能が薄型電池および／または電波を電源として作動するものであり、制御部と記憶メモリを備え、必要なデータ等を表示する表示部が外部装置により書き換えされる磁気表示部であることを特徴とする表示機能付き非接触ICカード。

【請求項7】 前記磁気表示部は、基板と、この上に直接または中間層を介して塗設されたマイクロカプセルを含有する表示層とを有し、当該マイクロカプセル中には、液体と、この液体の中に浮遊しかつ磁場に応答する磁性粉とが含有されており、前記非接触ICカードの記憶メモリに記録された情報に基づき、前記磁気表示部の表示層に目視可能な情報の記録および消去ができるようにしたことを特徴とする請求項6記載の表示機能付き非接触ICカード。

【請求項8】 請求項1から請求項5記載のホテルサービスシステムに使用する表示機能付き非接触ICカードであって、非接触でデータの送受信を行う機能が薄型電池および／または電波を電源として作動するものであり、制御部と記憶メモリを備え、必要なデータ等を表示する表示部が外部装置により書き換えされる熱記録表示部であることを特徴とする表示機能付き非接触ICカード。

【請求項9】 前記熱記録表示部は、可逆性感熱記録層が熱により透明状態と白濁状態とが可逆的に変化し、か

つ常温で透明状態と白濁状態とが保持できるポリマー組成物からなることを特徴とする請求項8記載の表示機能付き非接触ICカード。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、表示機能付き非接触ICカードを利用したホテル内施設や提携店、提携施設のサービスシステムとそれに使用する表示機能付き非接触ICカードに関するものであって、当該ICカードをお客様に携帯させることにより、ルームキーとして使用することや、レストラン、ラウンジや売店あるいはホテル所在地近隣の提携店での買い物や施設利用のキャッシュレス化を図ること、さらにはホテル内のプールやテニスコートの施設や提携するスキー場、ゴルフ場、テーマパーク、野球場、サッカー場、映画館等、あるいは提携交通機関の予約表示等をも一括して行うことを可能とするものである。従来の接触型ICカードと異なり各種端末と非接触交信し読み書き可能とすること、表示機能を持たせることにより一層のサービス向上が図れる。

【0002】

【従来の技術】従来より、ホテル業務において、磁気カードまたはICカードを利用する技術が紹介されている。例えば、特公昭58-51593号公報等では、客室の鍵として、メカニカルキーの代わりにカードキーを利用することで、鍵管理を合理化することが行われている。例えば、利用者がフロントに申込みをすると、フロント担当者が客室ナンバー、宿泊数等をカードに表示して利用者に渡す。利用者は受け取ったカードを用いて、客室のドアロックを解除して、客室を利用するというものである。

【0003】また、利用料金の精算方法に対しても、カードを用いて合理化することが各種行われている。例えば、予め会員登録をし会員カードを受け取る。ホテル内の受付機器に会員カードを読み込ませ、前払金を投入することにより利用申込みを行う。そして、前払金入金により受付機器は会員カードに鍵の機能を付与するというシステムである。

【0004】これらホテル内の個々の業務について独立に自動化又は半自動化するシステムに対して、カードキーを利用して、鍵管理、料金精算等の全業務を一括して無人自動化するシステムも特開平8-202776号公報に提案されている。しかし、同公報に記載されているシステムはホテルの完全無人化を目的とするシステムであるが必ずしも現実的なものではない。また、カードキーに、ICカードを利用したものも提案されているが、非接触で端末装置と交信できるものではないので、客室への入室に際して、カードキーをドアのゲート装置に挿入するような手間がかかる。また、カードキーやキャッシュレス化、すなわちカードによる費用精算等の個々のシステムに利用する用途は提案されているが、それらの機

能を含め、ホテル内またはホテル外の提携施設や提携店とで総合的に利用できるシステムは提案されていない。また、サービスポイント加算によりお客様に特典を与えることも考慮されていない。従って、従来提案のシステムはホテル業務の合理化と幅広いサービスを図るためにはものたりないシステムとなっていた。

【0005】

【発明が解決しようとする課題】そこで本発明は、前記のようなホテル等におけるお客様や客室管理上の問題を含め、ホテル内および提携店、提携施設を含めたキャッシュレス化や各種施設の予約機能やサービスポイント管理機能を持たせようとするものであり、お客様に、表示機能付き非接触ICカードを携帯させて、当該非接触ICカードにより非接触で客室への入室を可能とするとともに、ホテル内の各種料金の支払いをキャッシュレス化すること、さらに、ICカードの表示部に客室ナンバーや購買・利用金額等を表示させて、お客様が利用し易くしサービスを向上させること、お客様や客室および施設管理あるいは事務管理を容易にすることを目的とする。

20 【0006】

【課題を解決するための手段】上記課題を解決するための、本発明のホテルサービスシステムの要旨の第1は、お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、①客室ルームキーとしての機能と、②ホテル内売店・レストラン、施設およびホテル外提携店、提携施設におけるキャッシュレス精算機能と、③付属および提携施設、提携交通機関における予約表示機能と、④ホテル内外の購買・利用金額に対するサービスポイント管理表示機能と、を有することを特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム、にある。かかるサービスシステムであるためお客様に対するサービスが向上するとともに業務の合理化が図れる。

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【0007】上記課題を解決するための、本発明のホテルサービスシステムの要旨の第2は、お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが情報記録部と情報表示部とを有し、①情報記録部には、カード識別ID、お客様氏名、客室ナンバー、ホテル内売店・レストラン、施設、ホテル外提携店、提携施設での購買・利用金額やそれらの合計金額、購買・利用金額に対するサービスポイントおよびホテル内外施設や提携交通機関の予約内容が記録されることと、②情報表示部には、客室ナンバー、ホテル内売店・レストラン、ホテル外提携店、提携施設での購買・利用金額やそれらの合計金額、購買・利用金額に対するサービスポイントおよびホテル内外施設や提携交通機関の予約内容がリーダライタにより書き込み表示されること、を特徴とする表示機能付き非接触ICカードを利用したホテルサ

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ービスシステム、にある。かかるサービスシステムであるためお客様に対するサービスが向上するとともに業務の合理化が図れる。

【0008】上記課題を解決するための、本発明のホテルサービスシステムの要旨の第3は、お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、①表示部に客室ナンバーを表示することと、②当該非接触ICカードを上記客室ナンバーのドアスキャナーに接近させることにより、客室ドアロックが解除されることと、③お客様の入室状況がホストコンピュータに送信されて記録されること、を特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム、にある。かかるサービスシステムであるためお客様に対するサービスが向上するとともに業務の合理化が図れる。

【0009】上記課題を解決するための、本発明のホテルサービスシステムの要旨の第4は、お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、①記録部にホテル内外での購買や施設、提携交通機関の利用時における購買・利用内容とその金額とそれらの合計金額および購買・利用に対するサービスポイントがスキャナーまたはPOSレジスタを通じて逐次記録されることと、②表示部にホテル内外での購買や施設、提携交通機関の利用時における購買・利用金額とそれらの合計金額および購買・利用金額に対するサービスポイントがリーダライタにより書き込み表示されることと、③ホテル内外での購買や施設の利用時における購買・利用金額とそれらの合計金額がホストコンピュータに送信されて記録されることと、④当該ホストコンピュータの記録データによって、チェックアウト時における料金の精算が行われること、を特徴とする表示機能付き非接触ICカードを利用したホテルサービスシステム、にある。かかるサービスシステムであるためお客様に対するサービスが向上するとともに業務の合理化が図れる。

【0010】上記課題を解決するための、本発明のホテルサービスシステムの要旨の第5は、お客様に表示機能付き非接触ICカードを携帯させてホテルのサービスを行うシステムであって、当該表示機能付き非接触ICカードが、①記録部にホテル内施設やホテル外提携施設、提携交通機関の利用予約が記録されることと、②表示部にホテル内施設やホテル外提携施設、提携交通機関の利用予約が表示されることと、③ホテル内施設やホテル外提携施設、提携交通機関の利用内容とそれらの合計金額がホストコンピュータに送信されて記録されることと、④当該ホストコンピュータの記録データによって、チェックアウト時における料金の精算が行われること、にある。かかるサービスシステムであるためお客様に対するサービスが向上するとともに業務の合理化が図れる。

【0011】上記課題を解決するための、本発明の非接触ICカードの要旨の第1は、請求項1から請求項5記載のホテルサービスシステムに使用する表示機能付き非接触ICカードであって、非接触でデータの送受信を行う機能が薄型電池および／または電波を電源として作動するものであり、制御部と記憶メモリを備え、必要なデータ等を表示する表示部が外部装置により書き換えされる磁気表示部であることを特徴とする。かかる非接触ICカードであるため、非接触でデータ通信が可能であり、かつホテル内外での購買・利用金額等を確実に表示することができる。

【0012】上記課題を解決するための、本発明の非接触ICカードの要旨の第2は、請求項1から請求項5記載のホテルサービスシステムに使用する表示機能付き非接触ICカードであって、非接触でデータの送受信を行う機能が薄型電池および／または電波を電源として作動するものであり、制御部と記憶メモリを備え、必要なデータ等を表示する表示部が外部装置により書き換えされる熱記録表示部であることを特徴とする。かかる非接触ICカードであるため、非接触でデータ通信が可能であり、かつホテル内外での購買・利用金額等を確実に表示することができる。

#### 【0013】

【発明の実施の形態】図1は、本発明のホテルサービスシステムを示す全体構成図である。本発明のホテルサービスシステムでは、お客様が表示機能付き非接触ICカード10をそれぞれ携帯する。当該表示機能付き非接触ICカードはお客様がチェックインの際、カード識別ID、お客様の氏名、客室ナンバー、宿泊内容等を入力してフロントで発行される。ホテル内の施設や提携施設あるいは提携交通機関を利用することが予め分かっている場合はそれらの予約内容も入力する。フロントにはカード発行装置95の他、パーソナルコンピュータ91、POSレジスタ94等が備えられる。ホストコンピュータ100、各客室のドアに設置されたドアスキャナー22、売店、レストラン、ラウンジ、ホテル内施設（例えば、プール、テニスコート）、ホテル外提携施設（例えば、スキー場、野球場、ゴルフ場、テーマパーク等）、近隣の提携店等に設置されたPOSレジスタおよびスキャナーのデータは送受信機を介してホストコンピュータに送信される。お客様が到着し、ICカード10が発行されて入力したお客様情報も直ちにホストコンピュータ100を介して各客室20に送信される。

【0014】客室ドアや各施設に設置したスキャナー22～72は、非接触ICカード10が接近すると呼び出し信号を送出する。ICカードは呼び出し信号を感知するとそれに呼応して応答信号を発して保持するデータを送出するので、スキャナーはそのデータを読み取ることができる。またスキャナーは必要に応じて情報を非接触ICカード10に書き込むことができる。例えば、ホス

トコンピュータが、フロントで入力したカード識別IDに対応する当該客室ナンバーのドアスキャナー22に対して、お客様が到着した情報を送信すると、ドアスキャナー22は、ICカード10が接近するとその識別IDを感知してホストコンピュータから送信された識別IDとの一致を確認した後、ドアロックを解除する。お客様がドアスキャナーを最初に通過した際に、その信号がホストコンピュータ100に送信され、ホストコンピュータは客室入室時刻を記録する。以降、お客様の入退室に伴い入室状況が逐次送信される。

【0015】お客様が売店、レストラン等で当該非接触ICカード10をキャッシュレス精算用カードとして使用する場合は、スキャナー32、42等で当該カードの真正が認識され、利用金額がPOSレジスタ34、44に入力されると同時に、利用金額、利用に伴うサービスポイント情報がホストコンピュータに送信される。カードの記録部に対してもスキャナーから書き込みが可能であるが、書き込みはPOSレジスタに直結したカードリーダーライタを介して記録してもよい。接触端末のない非接触ICカードに対してもカードをリーダーライタに差し込んで記録する装置が使われており、カードメモリへの記録およびカード表示部への書き込みが、当該リーダーライタによっても行われることになる。

【0016】お客様がホテル内の施設（プール、テニスコート等）や近隣の野球場、スキー場、ゴルフ場、テーマパーク、その他の提携施設や提携交通機関を利用する場合は、ICカードには予め、予約時刻や指定席、利用時間等の予約内容が記録されておりカードの表示部に表示される。また、スキャナー62にお客様の情報を送信しておき、ゲートを通過できるようにしておいてもよい。スキー場のリフト券売り場等の場合は所定回数、通過できるようにすることができる。お客様がそれらの施設を利用し終わった場合は、利用内容、利用金額がPOSレジスタ64に入力されると同時に、利用内容、利用金額、利用に伴うサービスポイント情報がホストコンピュータ100に送信される。

【0017】お客様がホテル近隣の提携店を利用した場合は、お客様がそれらの提携店を利用した際に、利用内容、利用金額がPOSレジスタ74に入力されると同時に、利用内容、利用金額、利用に伴うサービスポイント情報がホストコンピュータに送信される。非接触ICカード10への記録、表示部への表示書き込みもホテル内の場合と同様にすることができる。ホストコンピュータ100は、これら各所からのデータを蓄積しており、お客様の総利用金額、利用に伴うサービスポイントの累計を集計して、チェックアウトの際は当該データをフロント90へ送信する。お客様がチェックアウトする際は、総利用金額に基づいて精算がされ、サービスポイントがある場合は、累計ポイントに見合う金額の減額がされるか、その他のサービスが提供される。

【0018】図2は、ホテルサービスシステムにおけるデータ通信系統を示す図である。図2のように、本発明のホテルサービスシステムの通信系統は、お客様が携帯する表示機能付き非接触ICカード10とホストコンピュータ100とフロント、客室、飲食等のレストラン、売店、ラウンジ、その他の施設（例えば、プール、テニスコート）およびホテル外の近隣の提携店や提携施設等に設置された各端末装置20〜70と、送受信器23〜73と、各端末装置とホストコンピュータとを接続するデータ回線110等から構成されている。近隣の提携店や提携施設とのデータ送信は公衆回線やイーサネットを経由するものであってもよい。図中、非接触ICカード10はお客様に携帯されて、各端末装置と非接触で交信している状態を示している。

【0019】各客室には、入室ドア近くに専用のドアスキャナー22が設けられ、前記のように非接触ICカードの識別IDを読み取ってドアロックを制御する。飲食等のレストラン、売店、専用ラウンジ、プール等の特定の端末装置は、スキャナーの他、POSレジスタ34、44、54、64、74を備えておりお客様の購買や施設の利用料金の精算を行う。これは現金ではなくICカードにその内容、金額を記録することにより行う。利用料金に対して一定のサービスポイントが加算される場合はポイントの書き込みも行われる。非接触ICカードには書き換え可能な表示部を有するので、お客様がそれらの表示の書き換えを希望する場合は、ICカードに接触的に読み取り書き込み可能な装置（以下「リーダーライタ」とする。）35、45、55、65、75を使用してカードへの書き込みを行う。

【0020】ホストコンピュータ100はフロント端末装置を兼ねるものであっても良いが、コンピュータ本体101、データベース102、送受信器103等を備えている。フロント、客室、飲食等のレストラン、売店、ラウンジ、プール等の施設、提携店、提携施設等に設置された端末装置20〜90からの送信データの全ては、ホストコンピュータ100に送信されてデータベース102に逐次蓄積される。また、ホストコンピュータ100からは、各端末装置が必要とするお客様のICカード10に転記すべきデータを演算または検索して各端末装置30〜90へ応答する機能を果たす。フロントに設置されたコンピュータ91、POSレジスタ94、カード発行機95は、送受信機93を介してホストコンピュータ100と接続される。

【0021】データベース102には、カード識別ID、お客様の氏名、お客様の属性、宿泊内容、宿泊日数、客室ナンバー、お客様のホテル内施設やホテル外提携施設の予約内容に関するデータが予め蓄積され、その後逐次入力されるホテル内外での各購買・利用金額、その合計金額、サービスポイントのデータに基づき更新される。なお、宿泊内容とは、1泊2日朝食付きとか、1

泊2日レディスプラン、1泊2日VIP朝食付きとかの内容をいう。また、予約内容には、お客様専用ラウンジ使用、プール、テニスコート等の遊戯施設の使用予定も含まれ、ホテル外の施設の予約予定には、野球場の指定席ナンバーや試合開始時間、交通機関の予約時間や指定席ナンバー、スキー場リフトの利用回数等も含まれる。

【0022】図3、図4は、お客様が携帯する表示機能付き非接触ICカードを示す図である。図3は、非接触ICカードの平面図、図4は、図3のA-A線における拡大した断面矢視図を示している。表示機能付き非接触ICカード10は、図3のように、カード型形状をしており、書き換え可能表示部11を有し、カード表面には現れないICチップ12とそれに接続する捲線コイル等からなるデータ送受信部13を有し、必要により薄型電池14をさらに内蔵している。図示のものは非接触通信専用のものであるが、外部装置との接触して通信する端末基板をさらに備える接触型非接触型共用のカードであってもよい。表示部11は、磁性粉体を利用した磁気表示部であるか、あるいは熱により可変表示可能な熱記録部とし、数行の文字が表示できるようにされている。カード表面には適宜な印刷図柄16をカードの表裏面に施しておくことができる。

【0023】表示機能付き非接触ICカード10は、図4のように、コアシート151とその表裏面を保護するオーバーシート152、153からなる基材15を有し、ICチップ12とデータ送受信部（アンテナコイル）13は、通常、コアシートとオーバーシートの間に設けられている。アンテナコイルは捲線であってもあるいは、コアシートまたはオーバーシート上にプリント配線の技術で形成されたものであってもよい。データ送受信部13の両端は、ICチップ12の両端子に接続されている。書き換え可能表示部11は、オーバーシートとコアシートをくり抜いて形成した凹部18の中に設けられている。薄型電池14はチップ駆動用の電源をアンテナコイルから得ない場合に設けるものであり、当該電池を内蔵させる場合には、カード基体のある程度厚肉に形成し電池収納部を設ける必要がある。前述した印刷図柄を設ける場合は、コアシートの表面またはオーバーシートのコアシート側となる面に設けておくのが印刷面保護の上で好ましい。

【0024】図5は、ICチップの回路構成を示すブロック図である。外部スキャナ22～72と通信している状況が示されている。データ送受信部13に電源回路121、クロック抽出回路122、復調器123の入力部が接続され、それぞれの出力部が処理回路124に接続されている。また、処理回路の出力部が変調器125に接続され、この変調器の出力部がデータ送受信部13に接続され、処理回路124にはメモリ126が接続されている。

【0025】表示機能付き非接触ICカード10は、そ

の機能として客室ドアスキャナ22等と非接触で通信可能であること、お客様の氏名、客室ナンバー、飲食等の使用金額等のデータを記憶できるメモリーを備えること、それらの内必要なデータをリーダライタ35等により書き込んで表示可能であること等が必要である。表示部11への記録は、非接触ICカード10のメモリー内容を各端末のリーダライタにより読みかつ書き込み表示することによりなされるか、あるいは表示部11への記録データは、ホストコンピューター100から各端末へと供給されるデータに基づき接触書き込みにより書き込み表示されることによって記録される。後者の場合は、ICカードが記憶するデータの一部を省略することができる。通常、お客様は、頻繁な書き換えは必要としないので、ホテル到着の際、フロントで書き込み表示をしたICカード10をお客様に渡すこととし、レストラン30、売店40等の場合は必要な時点でリーダライタに非接触ICカード10を挿入して表示部11の書き換えを行えば十分と考えられる。

【0026】次に、表示部11が磁気表示部111である場合について説明する。図4のように、カード基体には表示部11を収納するための凹部18が形成される。この凹部18は、一般にはいわゆるザグリ加工によって形成されるが、オーバーシートに予め凹部を形成しておき、これとコアシートとを積層することにより凹部を形成してもよい。図6は、磁気表示部の断面を部分的に示す図である。このように形成された凹部18の中には磁気表示部111が形成される。磁気表示部111は、その一構成例として図6に示すように基板112と、この基板の上に形成された着色層113、表示層114、保護層116を順次備えた積層構造とすることができる。表示層114はマイクロカプセル114mとバインダー114bとからなり、マイクロカプセル114m中には磁性粉が含有されている。なお、表示層114と保護層116との間には、通常、これらを接着するための接着層115が設けられる。

【0027】基板112は、各種プラスチック、紙、金属板等種々のものが適用可能である。中でも各種プラスチック、特にポリエチレンテレフタレートを用いることが好ましい。厚さの好適例としては、100 $\mu$ m程度である。この基板112の上に形成される着色層113は、表示のコントラストを明瞭にするために形成されており、通常、黒く着色された墨インクが用いられる。他の着色の手段として、例えば、硫酸バリウム、マイクロシリカ、カーボンブラック等の顔料を各種プラスチック原料に混練して用いてもよい。この着色層113の厚さの好適例は2～10 $\mu$ m程度である。

【0028】このような着色層113の上に設けられる表示層114は、複数のマイクロカプセル114mとバインダー114bを備える。マイクロカプセル114m中には液体状のビヒクルおよび磁性粉が含有されてお



り、磁性粉はビヒクル中に浮遊した状態になっている。ビヒクルとしては、極性液体と、疎水性液体と、熱可塑性樹脂とを含有させることが好ましい。

【0029】磁性粉としては、鉄、ニッケル、鉄-ニッケルや鉄-ニッケル-クロム等のステンレススチール、アルミニウム-コバルト合金、サマリウム-コバルト合金、バリウム-フェライト等の磁性粉が用いられる。磁性粉の形状としては、いわゆるフレーク形状のものが好ましく、厚さはできるだけ薄く厚さと粒径の比が大きいものが好ましい。粒径は、3~15 $\mu\text{m}$ 程度とされる。粒径が大きくなると、カプセルの粒径との関係で、カプセル内にうまく収納されず、また、外部磁気への反応が遅くなる。一方、粒径が小さくなると、磁化させた時、水平方向と垂直方向での光反射率の差が小さくなり、記録時のコントラストが悪くなる。このような磁性粉の保磁力は、用いられる媒体の用途によって適宜選定すればよく、通常は、5000e (エルステッド) 以上のものを用いる。

【0030】さらに、マイクロカプセル内には、コントラストを向上させるために染料または顔料を含有させることが好ましい。マイクロカプセルの粒径は、体積平均径で10~100 $\mu\text{m}$ が好適である。この値があまり小さくなると、カプセル内に収納される磁性粉の総量が少なくなるために、記録時のコントラストが十分でない。逆に、この値が大きくなりすぎると、記録層表面に凹凸を生じ、記録画像が不均一に成ってしまう。

【0031】このようなマイクロカプセルを塗設するのに用いられるバインダーとしては、マイクロカプセル壁を損傷させず、かつ着色層113表面によく接着するものであれば特に制限はない。より好適な具体例としては、ヒドロキシエチルセルロース、カルボキシメチルセルロース、ポリビニルアルコール、ポリビニルピロリドン等が挙げられる。このようなマイクロカプセルを含有する表示層114の好適例としての厚さは、200 $\mu\text{m}$ 程度とされる。

【0032】このような表示層114の上には、接着層115を介して保護層116が設けられる。接着層115としては、ポリエステル、アクリル等の材質が用いられる。このような接着層115の好適例としての厚さは、5~10 $\mu\text{m}$ 程度とされる。保護層116の好適例としての厚さは、100 $\mu\text{m}$ 程度とされる。上述したように形成される磁気表示部111は、例えば、その基板112の片面に形成された粘着層を接着層として、前記基材15の凹部18の中に収納、接着される。

【0033】図7は、磁気表示部の表示状態を説明する図である。図7(A)は、表示状態、図7(B)は、表示を消去した状態を示している。表示層114に、図7(A)のように垂直磁場 $\phi_v$ をかけると、マイクロカプセル114m中の磁性粉117aは垂直方向に整列して、外部からの入射光 $L_i$ は、着色層113に達してこ

こで反射され、反射光 $L_o$ を生じる。この状態では、着色層113の色が反射光として目視される。一方、表示層114に、図7(B)のように水平磁場 $\phi_h$ をかけると、マイクロカプセル114m中の磁性粉117aは水平方向に整列して、外部からの入射光 $L_i$ は、着色層113に達せず、磁性粉表面で反射され、反射光 $L_o$ を生じる。この状態では、磁性粉117aの色が反射光として目視される。

【0034】従って、図7(B)の状態では明るい金属色の反射光が観察されるので、この状態を消去状態とし、図7(A)の着色層113が観察される暗い状態を表示状態とすれば、カードを水平方向に走査する際に、外部磁場の状態を垂直-水平と変化させることにより表示-消去の状態を連続的に形成することができる。すなわち外部磁場の変化を文字コードデータに基づきON-OFFさせれば文字表示ができる。かかる磁気表示は、一旦記録されると、他の磁気記録媒体に接触しない限りほぼ永続的に保持されるので、長期間に及んでも書き換え等の必要は特にない。本発明システムの場合、この外部磁場の変化を生じさせるリーダライタを各端末装置およびフロント90に設けることになる。このような磁気表示自体については、特開平8-90972号公報等に記載され公知のものであるのでさらなる詳細な記載は省略する。

【0035】次に、表示部11が熱記録表示部211である場合について説明する。図4のように、カード基体には表示部11を収納するための凹部18が形成されるのは、磁気表示の場合と同様であるが、熱記録表示の場合は磁気表示の場合よりは薄層とすることができ。図8は、熱記録表示部の断面を部分的に示す図である。このように形成された凹部18の中には熱記録表示部211が形成される。熱記録表示部211は、その一構成例として図8に示すようにベース基板212と、この基板の上に形成された着色層213、表示層214、保護層216を順次備えた積層構造をなしている。保護層と表示層の間には接着層215を設けてもよい。

【0036】熱記録表示には可逆性感熱記録材料を使用することができる。可逆性感熱記録材料は、初期状態では透明な物質であるが、常温より高い一定温度 $t_0$ まで加熱し冷却すると前記の加熱された部分が白濁し、常温より高くかつ $t_2$ より低い温度 $t_1$ で加熱し冷却すると透明になる性質を有する物質が使用される。図9は、可逆性感熱記録材料の特性の一例を示す図である。例えば、常温において透過率 $t_{r1}$ である記録材料を温度 $t_0$ を超え、 $t_1$ まで加熱すると透過率は $t_{r2}$ の透明状態になり、加熱を止めて冷却または自然放置すると、そのままの透明な状態を保持する。ここで再び加熱し、 $t_1$ を超えて $t_2$ まで加熱した後に冷却し、温度を $t_0$ 以下にすると透過率は、 $t_{r1}$ の白濁状態となる。従って、可逆性感熱記録材料はその加熱前歴により常温にお

いて、 $tr_2$ （透明状態）と $tr_1$ （白濁状態）とすることができる。

【0037】このような物質としては、例えば、ペヘン酸、ラウリン酸、ステアリン酸等の高級脂肪酸が塩ビ酢ビ共重合体、塩化ビニリデン等の高分子マトリックス中に分散されたもので、その他に界面活性剤などが少量添加されている。この感熱記録剤層自体が、成膜性があるので、当該層単独で用いて使用することもできるが、表示層214の加熱側の面に例えば、エポキシ樹脂、シリコン樹脂等の薄層からなる保護層216、反対側の面にベース基板212を設けることが可能である。また、着色層213を設けることにより表示を鮮明にすることができる。

【0038】熱記録層211の記録には、例えば、選択的に加熱することができるシリアル型のサーマルヘッドを保護層216に圧着するようにして使用することで、文字コードデータを変換して通電し加熱することにより、目視可能な表示をすることが可能となる。このような熱記録表示についても実開平3-70977号、特開平2-50897号公報等に記載され公知のものである。

【0039】図10は、表示部に表示される表示内容を示す例である。図10では、お客様の客室ナンバー、ホテル内でのレストラン等での利用金額、当該時点までの合計金額が表示されている。また、サービスポイントの累計が表示される。さらにホテル内施設や外部提携施設、交通機関等の予約がある場合は予約内容と座席ナンバーやあるいは予定時刻等を表示するようにする。お客様の氏名はICカードのメモリーに記録されているが、プライベート保持上、通常は表示しない。その他、宿泊内容、適宜なホテル内外の案内等を表示するようにしてもよい。表示部11は、メモリーの内容を直接に読み取って（外部装置を介さないで）表示することはできないので、表示内容は外部リーダライタ35〜75、95により書き込まれた内容を保持していることになる。ただし、お客様がホテル内で使用した金額等のメモリ126への記録については、その都度、スキャナ32〜72またはリーダライタ35〜75を介して書き換えが行われる。

【0040】次に、本発明のホテルサービスシステムを利用する状況について説明する。チェックイン時、お客様はフロントにおいて、お客様氏名、お客様属性、宿泊内容（宿泊日数、ディナー、朝食、専用ラウンジの使用等）、予約内容等を告げる。これらのデータをコンピュータ91に入力すると宿泊内容に応じた客室ナンバーが表示される。提携施設や交通機関の予約内容はその後逐次追加できるものとする。フロント担当者は、表示機能付き非接触ICカードに、リーダライタ95により客室ナンバー等を表示し、当該非接触ICカード10をお客様に貸与する。また、表示は特に必要としないが朝食

等の必要な宿泊内容がメモリーに転記されて記憶される。お客様はICカードを受け取って客室に向かう。同室に家族が宿泊する場合のように同一の客室ナンバーに複数のお客様の場合は、全員に表示機能付きICカード10を貸与するのが好ましいが、チェックアウト時の精算は代表者が合算して行うことになる。ホストコンピュータ100は、前記のようにコンピュータ本体101、データベース102、送受信器103を備えているので、宿泊内容の記憶、各客室の使用状況の登録、お客様の各種購買金額、利用金額に関するデータ処理、累計サービスポイント計算を行い、チェックアウト時における料金の精算等のフロント業務に関する各種のデータ処理支援を行う。

【0041】客室前において、お客様は非接触ICカードをドアスキャナ22に接近させると、スキャナは、お客様のICカードのデータ内容を非接触で読み取って、ICカード10から認識した客室ナンバーあるいは識別IDとスキャナが記憶するナンバーが一致する場合には、ドアロックを解除する。この時、客室ドアロックが解除されたデータは、ホストコンピュータ100に送信され、お客様が客室に入室した時刻として記録される。同様にお客様が客室から外に出る場合も同様に記録されるので、お客様が滞在中か外出中かをフロントが把握することも容易となる。単純に客室ナンバーとドアスキャナの記憶ナンバーの一致では、カードを紛失したり落とした場合の安全性の問題もあるので、お客様カード固有の識別IDとの組み合わせによりドアロックが解除されるようにするのが好ましい。客室内において、お客様が冷蔵庫等内の飲食物について有料の飲食をする場合とか外部に電話をする場合の料金精算等も室内にスキャナを設けて、同様にホストコンピュータ100にリアルタイムに記録するようにしてもよい。

【0042】お客様が専用ラウンジを利用する時、非接触ICカードをラウンジのゲートスキャナ52に接近させると、スキャナは、お客様のICカードのデータ内容を非接触で読み取って、ICカードがお客様であることを認識した場合、あるいは利用申込みをしたお客様である場合は、ドアロックを解除する。これによりお客様は専用ラウンジを利用可能となる。従って、お客様以外の者が接近してもドアは閉じたままであり、専用ラウンジを利用することができない。お客様が、ラウンジ内で利用した各種の料金は、スキャナまたは係員のPOSレジ操作によりICカードに記録され、その際の使用金額とそれまでの合計の使用金額および累計サービスポイントが、ICカードの表示部に表示される。このようにスキャナはPOSレジ付近の他、ゲート部分等にも設ける等、複数箇所への設置が可能なものである。これらの機能は、ホテル内での他の遊戯施設でも同様であり、お客様以外の無断利用を排除することができ、利用者の安全を確保することができる。

【0043】レストランや売店の利用時、レストランや物品の販売場所のPOSレジスタ34、44は、非接触ICカード10を携帯するお客様が当該レストランで飲食したメニューの種類とメニューの料金または売店等の販売場所で購入した物品の種類と物品の料金およびサービスポイントがスキャナまたは係員のPOSレジ操作により入力される。当該POSレジスタ34、44は、それらのデータを送受信器33、43を介してホストコンピュータ100に送信して、ホストコンピュータの演算と指示を介して、当該非接触ICカード10の合計金額の加算がなされる。

【0044】料金の精算は、お客様のチェックアウト時に行うことになる。非接触ICカードの表示部11には、ホテル内や提携店、施設で飲食したり購入・利用した金額の全ての金額の合計金額および累計サービスポイントが表示されているので、通常の場合は合計金額が、これと異なる金額となる場合はない。この合計金額に対して消費税、サービス税等を加算した金額、累計サービスポイントに対する減額がお客様への請求金額となる。前記のように同室複数のお客様の場合は代表者が合算して支払うことになる。お客様は、料金の支払いをするとともに表示機能付き非接触ICカード10をフロントに返却する。非接触ICカード10は書き換えにより再使用が可能である。

【0045】

【実施例】以下、本発明の実施例につき、図1～図10を参照して説明する。

＜表示機能付き非接触ICカードの製造＞お客様が携帯する表示機能付き非接触ICカード10を、表示機能を磁気表示機能として、以下のようにして製造した。厚み25 $\mu$ mのポリエチレンテレフタレートフィルムをコアシート151として、その片面にアンテナコイル（データ送受信部13）を形成するとともにICチップ接続端子を形成した。当該接続端子にICチップ（メモリ64バイト）端子を接合するとともに、ICチップ接続両端子とアンテナコイルを短絡が生じないように接続した。アンテナコイルはコアシートの表面に厚み20 $\mu$ mのアルミ層を形成しておき、これをカード本体部の外周内側に沿って線幅160 $\mu$ mで、4回巻の巻線として残るようにフォトエッチングして形成した。このコアシートの両面にオーバーシート152、153として、厚さ100 $\mu$ mのポリエチレンテレフタレートフィルムにポリエステル系接着剤を予め塗布しておいたオーバーシート（接着剤層の層厚各280 $\mu$ mで塗布）を積層してから加熱プレスしてカード基体とした。なお、表面側のオーバーシートには予め磁気表示部を陥入させる凹部を形成しておいた。プレス後のカード層厚は、0.76mmとなった。

【0046】磁気表示部111として、フレック状のバリウムフェライト磁性粉（粒径6 $\mu$ m）をエチルセルロ

ースとアルコール溶剤からなるビヒクルに分散させてマイクロカプセル114m化した。これをポリビニルアルコールをバインダーとして黒色に着色層113を形成した厚さ80 $\mu$ mのポリエチレンテレフタレートフィルム基材112表面上に厚さ100 $\mu$ mとなるように塗布して磁気表示部111とした。この上に厚さ30 $\mu$ mのポリエステルフィルム保護層116を接着層115を介して設け磁気表示部111を完成した。当該磁気表示部111をを前記の非接触ICカード10の凹部に嵌め込んだ。

【0047】＜ホテルサービスシステムの実施試験＞上記で試作した、表示機能付き非接触ICカード10をホテルお客様に携帯させて実施試験を行った。なお、磁気表示部のリーダライタには大日本印刷株式会社製（MCP200ZD）を使用した。まず、非接触ICカードにお客様氏名、客室ナンバー、宿泊内容等のデータをフロントのカード発行装置95により入力し、ICカード10に書き込み表示したところ明瞭な表示が得られた。お客様が客室ナンバーのドアスキャナに接近した際、当該ドアスキャナ22は、ICカード10の客室ナンバーを認識しドアロックが解除された。お客様がドアスキャナ22を最初に通過した際に、客室入室時刻がホストコンピュータに送信され、ホストコンピュータのデータベース102に記録された。

【0048】使用金額に対する料金の精算は、お客様の客室ナンバー単位で集計して使用金額の合計演算をホストコンピュータ本体101が行い、その結果をお客様データとしてデータベース102に格納した。チェックアウト時、お客様は、フロントに表示機能付き非接触ICカード10を提示し、ホストコンピュータ100のデータとの突き合わせがなされ、使用料金が認識され累計ポイントを加味して料金の精算が行われた。

【0049】

【発明の効果】以上詳述のように、本発明のホテルサービスシステムによれば、

①お客様がホテル内の各端末装置と非接触で交信できるデータ表示機能付き非接触ICカードを携帯しているので、各端末装置は当該非接触ICカードが保持する客室ナンバーに基づいて当該ホテルの客室ドア開閉の制御、お客様専用ラウンジの入室管理等を行うことができ、ホテル内の安全性が確保できる。

②また、当該非接触ICカードによりホテル内での購買、施設の利用、ホテル外提携店や施設での購買、利用をキャッシュレスで精算することができ、現金を持ち歩くことによる危険が伴わない。また、表示部には購買や施設の利用金額の合計が表示されるので、予算金額を超えて出費してしまうことがない。

③ホテル内外での購買や施設の利用金額に対してサービスポイントを管理することができるので、チェックアウト時にサービスポイントに応じた割引精算ができ、ホテ

ル内の購買や提携店、提携施設の利用が促進される。

④野球場やサッカー場あるいは提携交通機関のように座席指定がある場合や時間が指定される場合には、それらをカードの表示部に表示することができるので、お客様が間違えることがない。

⑤お客様はホテル内外の飲食や物品の購買・利用金額の全ての精算をホテルのフロントで処理することができるので逐次の支払いの手間に煩わされることがない。また、サービスポイントによる利益も得られる。

さらに、本発明の表示機能付き非接触ICカードは、このようなシステムでの利用に十分な機能を発揮することができる。

#### 【図面の簡単な説明】

【図1】 本発明のホテルサービスシステムを示す全体構成図である。

【図2】 ホテルサービスシステムにおけるデータ通信システムを示す図である。

【図3】 お客様が携帯する表示機能付き非接触ICカードを示す平面図である。

【図4】 お客様が携帯する表示機能付き非接触ICカードを示す断面図である。

【図5】 ICチップの回路構成を示すブロック図である。

【図6】 磁気表示部の断面を部分的に示す図である。

【図7】 磁気表示部の表示状態を説明する図である。

【図8】 熱記録表示部の断面を部分的に示す図である。

【図9】 可逆性感熱記録材料の特性の一例を示す図である。

【図10】 表示部に表示される表示内容を示す例である。

#### 【符号の説明】

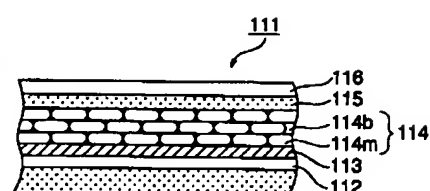
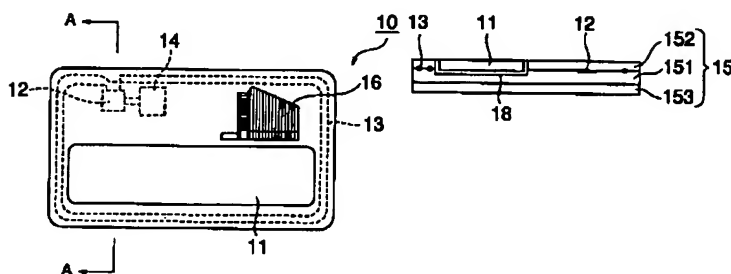
10 表示機能付き非接触ICカード  
11 書き換え可能表示部  
12 ICチップ

13 データ送受信部  
14 薄型電池  
15 基材  
18 凹部  
20 客室端末装置  
30 レストラン端末装置 40 売店端末装置  
50 ラウンジ端末装置 60 プール等の施設端末装置  
70 提携店・提携施設端末装置  
90 フロント  
91 パーソナルコンピュータ  
95 カード発行装置  
22 ドアスキャナー  
32, 42, 52, 62, 72 スキャナー  
23, 33, 43, 53, 63, 73, 93, 103 送受信器  
34, 44, 54, 64, 74, 94 POSレジスタ  
35, 45, 55, 65, 75, 95 リーダライタ  
100 ホストコンピュータ  
101 コンピュータ本体  
102 データベース  
110 データ回線  
121 電源回路 122 クロック  
抽出回路  
123 復調器 124 処理回路  
125 変調器 126 メモリ  
111 磁気表示部  
211 熱記録表示部  
112, 212 基板  
113, 213 着色層  
114, 214 表示層  
115, 215 接着層  
116, 216 保護層  
117a 磁性粉

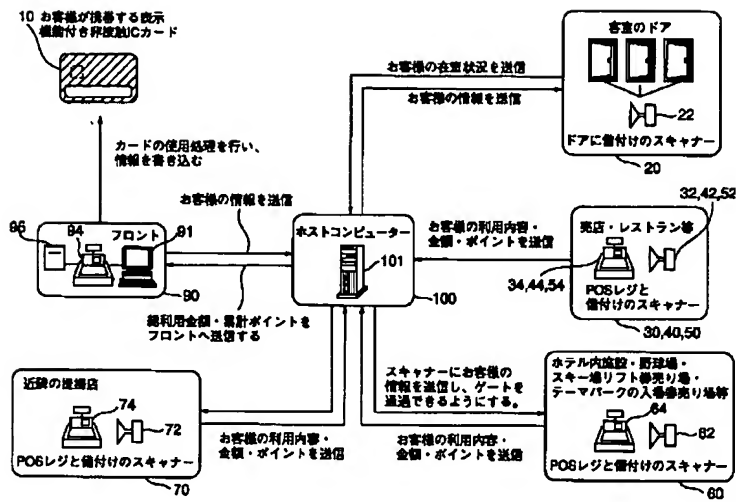
【図3】

【図4】

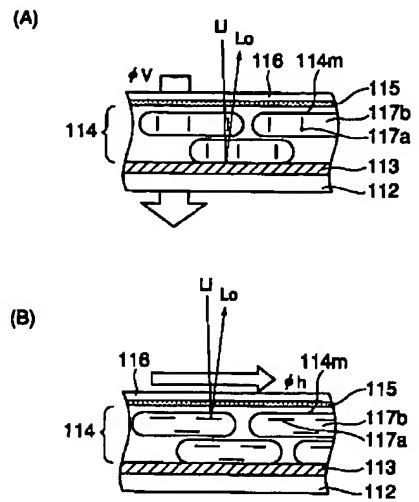
【図6】



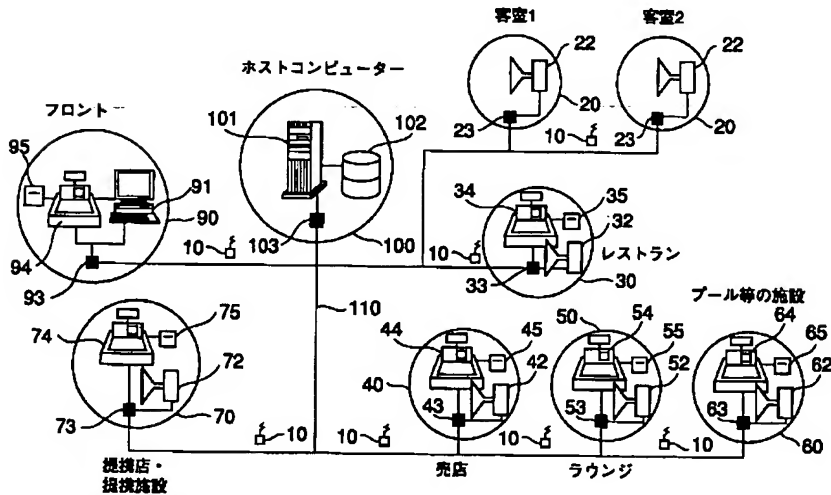
【図1】



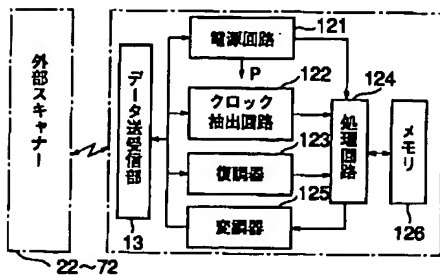
【図7】



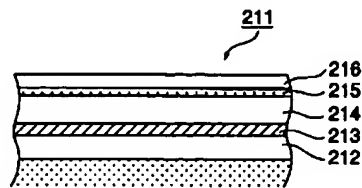
【図2】



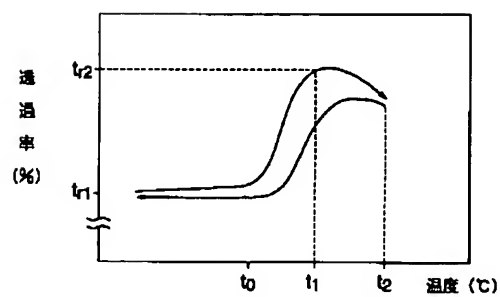
【図5】



【図8】



【図9】



【図10】

11

客室 No.	1018, 累計ポイント	〇〇〇
利用金額	5000円, 合計金額	25000円
予約内容	×××, 座席 No.	△△△

## CLAIMS

[Claim(s)]

[Claim 1] The system which is characterized by providing the following and which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel The noncontact IC card with a display function concerned is a function as a \*\* cabin room key. \*\* The cashless payment settlement-of-accounts function in the canteen in a hotel and a restaurant, a facility and a cooperation-hotel outside store, and a cooperation facility \*\* Attachment and a cooperation facility, the reservation display function in a cooperation means of transportation \*\* The service point management display function to purchasing / utilization amount of money of hotel inside and outside

[Claim 2] It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. The noncontact IC card with a display function concerned has the information Records Department and the information-display section. In \*\* information Records Department Card identity ID, a visitor name, a cabin number, the canteen in a hotel and a restaurant, The content of reservation of the service point to purchasing / utilization amount of money in a facility, a cooperation-hotel outside store, and a cooperation facility, those total amount of money, and purchasing / utilization amount of money and a hotel inside-and-outside facility, or a cooperation means of transportation is recorded, In the information-display section, \*\* A cabin number, the canteen in a hotel and a restaurant, a cooperation-hotel outside store, The content of reservation of the service point to purchasing / utilization amount of money, those total amount of money, and purchasing / utilization amount of money and hotel inside-and-outside facility in a cooperation facility, or a cooperation means of transportation writes in by the reader writer, and is displayed, The hotel service system using the noncontact IC card with display capabilities by which it is characterized.

[Claim 3] that are the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel, and the noncontact IC card with display capabilities concerned displays a cabin number on \*\* display, and \*\* -- the hotel service system using the noncontact IC card with display capabilities characterized by that a cabin door lock is canceled by making the noncontact IC card concerned approach the door scanner of the above-mentioned cabin number, and transmitting and recording \*\* visitor's entrance situation on a host computer.

[Claim 4] It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. Purchasing and the facility in hotel inside and outside [ noncontact IC card / concerned / with a display function / Records Department / \*\* ], The content of purchasing / utilization in the utilization time of a cooperation means of transportation, its amount of money, those total amount of money, and the service point to purchasing and utilization are serially recorded through a scanner or a POS register, \*\* The service point to purchasing / utilization amount of money in the utilization time of purchasing in hotel inside and outside, a facility, and a cooperation means of transportation, those total amount of money, and purchasing / utilization amount of money writes in a display by the reader writer, and is displayed on it, \*\* that purchasing / utilization amount of money in purchasing in hotel inside and outside or the utilization time of a facility and those total amount of money are transmitted and recorded on a host computer, and \*\* -- with the record data of the host computer concerned The hotel service system using the noncontact IC card with display capabilities characterized by performing settlement of accounts of the tariff at the time of check-out.

[Claim 5] It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. Utilization reservation of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation is recorded for the noncontact IC card with a display function concerned on \*\* Records Department, \*\* Utilization reservation of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation is displayed on a display, \*\* that the contents of utilization and those total amount of money of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation are transmitted and recorded on a host computer, and \*\* -- with the record data of the host computer concerned The hotel service system using the noncontact IC card with display capabilities characterized by performing settlement of accounts of

the tariff at the time of check-out.

[Claim 6] The noncontact IC card with display capabilities characterized by being the noncontact IC card with display capabilities used for a hotel service system according to claim 5 from claim 1, and being the magnetic display by which the display as which the function which transmits and receives data by non-contact operates considering a thin cell and/or an electric wave as a power source, is equipped with a control section and storage memory, and displays required data etc. is rewritten by the external device.

[Claim 7] Said magnetic display has a substrate and a display layer containing the microcapsule painted through direct or an interlayer on this. In the microcapsule concerned The magnetic powder which floats in a liquid and this liquid and induces a magnetic field contains. The noncontact IC card with a display function according to claim 6 characterized by what the informational record and informational elimination which can be viewed in the display layer of said magnetic display could be made to carry out based on the information recorded on the storage memory of said noncontact IC card.

[Claim 8] The noncontact IC card with display capabilities characterized by being the noncontact IC card with display capabilities used for a hotel service system according to claim 5 from claim 1, and being the heat record display by which the display as which the function which transmits and receives data by non-contact operates considering a thin cell and/or an electric wave as a power source, is equipped with a control section and storage memory, and displays required data etc. is rewritten by the external device.

[Claim 9] Said heat record display is a noncontact IC card with a display function according to claim 8 characterized by a reversibility heat-sensitive recording layer consisting of a polymer constituent which a transporence condition and a nebula condition change with heat reversibly, and can hold a transporence condition and a nebula condition in ordinary temperature.

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[Translation done.]



## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] The facility in a hotel and cooperation store where this invention used the noncontact IC card with a display function, By making a visitor carry the IC card concerned about the noncontact IC card with a display function used for the service system of a cooperation facility, and it Cashless payment-ization of shopping in using it as a room key, a restaurant and a lounge, a canteen, or the cooperation store of the hotel address neighborhood or facility utilization is attained, Furthermore, the facility and the skiing area which ties up of the pool in a hotel or a tennis court, a golf course, a theme park, a baseball field, a soccer stadium, a movie theater, etc. make it possible to put in block the reservation display of a cooperation means of transportation etc., and to perform it. Much more improvement in service can be aimed at carrying out non-contact communication with various terminals unlike the conventional contact smart card, and making R/W possible, and by giving display capabilities.

[0002]

[Description of the Prior Art] Conventionally, in hotel operation, the technique of using a magnetic card or an IC card is introduced. For example, at JP,58-51593,B, rationalizing key management is performed by using a card key instead of a mechanical key as a key of a cabin. For example, if a user proposes to a front, a front person in charge will display a cabin number, the number of stays, etc. on a card, and will hand a user. Using the received card, a user cancels the door lock of a cabin and uses a cabin.

[0003] Moreover, rationalizing using a card is various line crack \*\*\*\*\* also to the settlement-of-accounts approach of a utilization tariff. For example, member registration is carried out beforehand and a member card is received. A member card is made to read into the reception device in a hotel, and a utilization application is made by injecting imprest. And it is the system that a reception device gives the function of a key to a member card by imprest payment.

[0004] The system which carries out uninhabited automation of all the operation, such as key management and tariff settlement of accounts, collectively to automation or the system made semi-automatic using a card key independently about each operation in these hotels is also proposed by JP,8-202776,A. However, although the system indicated by this official report is a system aiming at full full automation of a hotel, it is not necessarily realistic. Moreover, although what used the IC card for the card key is proposed, since it cannot communicate with a terminal unit by non-contact, on the occasion of the entrance into a room to a cabin, it takes time and effort which inserts a card key in the gating arrangement of a door. Moreover, although it is, a proposal, now the systems including those functions which can be used synthetically in the cooperation facility and cooperation store in a hotel and outside a hotel are not proposed for the application used for each systems, a card key, cashless-payment-izing, i.e., the costs settlement of accounts by the card etc., etc. Moreover, giving a visitor a privilege by service point addition of points is not taken into consideration, either. Therefore, the system of the conventional proposal had turned into an unsatisfactory system, in order to aim at rationalization of hotel operation, and broad service.

[0005]

[Problem(s) to be Solved by the Invention] Then, this invention includes the visitor in the above hotels etc., and the problem on cabin management. It is what is going to give the reservation function and service point function manager of cashless-payment-izing including the inside of a hotel and a cooperation store, and a cooperation facility, or various facilities. While making a visitor carry a noncontact IC card with a display function and enabling the entrance into a room to a cabin by non-contact with the noncontact IC card concerned A visitor is made further easy to display a cabin number, purchasing / utilization amount of money, etc. on the display of an IC card, and to use, and service is raised [ cashless-payment-izing payment of the various tariffs in a hotel, and ], It aims at making easy a visitor, a cabin and facility management, or administration.

[0006]

[Means for Solving the Problem] The 1st of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. The noncontact IC card with display capabilities concerned The function as a \*\* cabin room key, \*\* The cashless payment settlement-of-accounts function in the canteen in a hotel and a restaurant, a facility and a cooperation-hotel outside store, and a cooperation facility, \*\* Be in the hotel service system using the noncontact IC card with display capabilities characterized by having the reservation display capabilities in attachment and a cooperation facility, and a cooperation means of transportation, and the service point management display capabilities to purchasing / utilization amount of money of \*\* hotel inside and outside. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0007] The 2nd of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. The noncontact IC card with a display function concerned has the information Records Department and the information-display section. In \*\* information Records Department Card identity ID, a visitor name, a cabin number, the canteen in a hotel and a restaurant, The content of reservation of the service point to purchasing / utilization amount of money in a facility, a cooperation-hotel outside store, and a cooperation facility, those total amount of money, and purchasing / utilization amount of money and a hotel inside-and-outside facility, or a cooperation means of transportation is recorded, In the information-display section, \*\* A cabin number, the canteen in a hotel and a restaurant, a cooperation-hotel outside store, The content of reservation of the service point to purchasing / utilization amount of money, those total amount of money, and purchasing / utilization amount of money and hotel inside-and-outside facility in a cooperation facility, or a cooperation means of transportation writes in by the reader writer, and is displayed, It is in the hotel service system using the noncontact IC card with display capabilities by which it is characterized. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0008] The 3rd of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel, and the noncontact IC card with display capabilities concerned displays a cabin number on \*\* display, \*\* By making the noncontact IC card concerned approach the door scanner of the above-mentioned cabin number It is in the hotel service system using the noncontact IC card with display capabilities characterized by that a cabin door lock is canceled and transmitting and recording \*\* visitor's entrance situation on a host computer. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0009] The 4th of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. Purchasing and the facility in hotel inside and outside [ noncontact IC card / concerned / with a display function / Records Department / \*\* ], The content of purchasing / utilization in the utilization time of a cooperation means of transportation, its amount of money, those total amount of money, and the service point to purchasing and utilization are serially recorded through a scanner or a POS register, \*\* The service point to purchasing / utilization amount of money in the utilization time of purchasing in hotel inside and outside, a facility, and a cooperation means of transportation, those total amount of money, and purchasing / utilization amount of money writes in a display by the reader writer, and is displayed on it, \*\* that purchasing / utilization amount of money in purchasing in hotel inside and outside or the utilization time of a facility and those total amount of money are transmitted and recorded on a host computer, and \*\* -- with the record data of the host computer concerned It is in the hotel service system using the noncontact IC card with display capabilities characterized by performing settlement of accounts of the tariff at the time of check-out. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0010] The 5th of the summary of the hotel service system of this invention for solving the above-

mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. Utilization reservation of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation is recorded for the noncontact IC card with a display function concerned on \*\* Records Department, \*\* Utilization reservation of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation is displayed on a display, \*\* that the contents of utilization and those total amount of money of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation are transmitted and recorded on a host computer, and \*\* -- be in settlement of accounts of the tariff at the time of check-out being performed with the record data of the host computer concerned. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0011] It is characterized by being the magnetic display by which it is the noncontact IC card with display capabilities used for the hotel service system of the summary of the noncontact IC card of this invention for solving the above-mentioned technical problem according to claim 5 from 1st claim 1, and the display which the function of transmitting and receiving data by non-contact operates considering a thin cell and/or an electric wave as a power source, is equipped with a control section and storage memory, and displays required data etc. is rewritten by the external device. Since it is this noncontact IC card, purchasing / utilization amount of money in hotel inside and outside etc. can be certainly displayed possible [ data communication ] by non-contact.

[0012] It is characterized by being the heat record display by which it is the noncontact IC card with display capabilities used for the hotel service system of the summary of the noncontact IC card of this invention for solving the above-mentioned technical problem according to claim 5 from 2nd claim 1, and the display which the function of transmitting and receiving data by non-contact operates considering a thin cell and/or an electric wave as a power source, is equipped with a control section and storage memory, and displays required data etc. is rewritten by the external device. Since it is this noncontact IC card, purchasing / utilization amount of money in hotel inside and outside etc. can be certainly displayed possible [ data communication ] by non-contact.

[0013]

[Embodiment of the Invention] Drawing 1 is the whole block diagram showing the hotel service system of this invention. In the hotel service system of this invention, a visitor carries the noncontact IC card 10 with a display function, respectively. In case a visitor is check-in, the noncontact IC card with display capabilities concerned inputs card identity ID, a visitor's name, a cabin number, the content of stay, etc., and is published in the front. When it turns out beforehand that the facility, cooperation facility, or cooperation means of transportation in a hotel is used, those contents of reservation are also inputted. A front is equipped with the personal computer 91 besides card issuance equipment 95, and POS register 94 grade. The data of the POS register installed in a host computer 100, the door scanner 22 installed in the door of each cabin, a canteen, a restaurant, a lounge, the facility in a hotel (for example, a pool, a tennis court), cooperation-hotel outside facilities (for example, a skiing area, a baseball field, a golf course, a theme park, etc.), a neighboring cooperation store, etc. and a scanner are transmitted to a host computer through a transmitter-receiver. A visitor arrives and the visitor information which IC card 10 was published and was inputted is also promptly transmitted to each cabin 20 through a host computer 100.

[0014] The scanners 22-72 installed in a passenger door or each facility send out ringing, if a noncontact IC card 10 approaches. Since an IC card sends out the data which emit and hold a reply signal in response to it if ringing is sensed, a scanner can read the data. Moreover, a scanner can write information in a noncontact IC card 10 if needed. For example, if the information which the visitor reached is transmitted to the door scanner 22 of the cabin number concerned corresponding to card identity ID which the host computer inputted in the front, the door scanner 22 will cancel a door lock, after checking coincidence with the discernment ID which has sensed the discernment ID and was transmitted from the host computer, if IC card 10 approaches. When a visitor passes a door scanner first, the signal is transmitted to a host computer 100, and a host computer records cabin entrance-into-a-room time of day. Henceforth, a staying-in-the-room situation is serially transmitted with close leaving of a

visitor.

[0015] The utilization amount of money and the service point information accompanying utilization are transmitted to a host computer at the same time Shinsei of the card concerned is recognized in a scanner 32 and 42 grades and the utilization amount of money is inputted into the POS registers 34 and 44, when a visitor uses the noncontact IC card 10 concerned as a card for cashless payment settlement of accounts at a canteen, a restaurant, etc. Although it can write in from a scanner also to the Records Department of a card, writing may be recorded through the card reader writer linking directly to a POS register. The equipment which inserts and records a card on a reader writer also to a noncontact IC card without a contact terminal is used, and record in card memory and the writing to a card display will be performed by the reader writer concerned.

[0016] When a visitor uses the facilities in a hotel (a pool, tennis court, etc.), a neighboring baseball field, a skiing area, a golf course, a theme park, and other cooperation facilities and cooperation means of transportation, the contents of reservation, such as reservation time of day, and a reserved seat, utilization time, are beforehand recorded on the IC card, and it is displayed on the display of a card. Moreover, a visitor's information is transmitted to the scanner 62 and you may enable it to pass through the gate. It can make it possible to pass the number of predetermined times in the case of the lift ticket counter of a skiing area etc. The content of utilization, the utilization amount of money, and the service point information accompanying utilization are transmitted to a host computer 100 at the same time the content of utilization and the utilization amount of money are inputted into the POS register 64, when a visitor finishes using those facilities.

[0017] The content of utilization, the utilization amount of money, and the service point information accompanying utilization are transmitted to a host computer at the same time the content of utilization and the utilization amount of money are inputted into the POS register 74 when a visitor uses the cooperation store of the hotel neighborhood, and a visitor uses those cooperation stores. Record to a noncontact IC card 10 and the display writing to a display can also be made to be the same as that of the case in a hotel. The host computer 100 is storing the data from these every place, totals the accumulating totals of the service point accompanying a visitor's total utilization amount of money and utilization, and transmits the data concerned to a front 90 in the case of check-out. In case a visitor checks out, when settlement of accounts is carried out based on the total utilization amount of money and there is a service point, abatement of the amount of money corresponding to the accumulating-totals point is carried out, or other services are offered.

[0018] Drawing 2 is drawing showing the data communication system in a hotel service system. Like drawing 2, the communication system of the hotel service system of this invention consists of data circuit 110 grades which connect each terminal units 20-70 installed in restaurants, such as the noncontact IC card 10 with a display function, the host computer 100 and front which a visitor carries, a cabin, and eating and drinking, a canteen, a lounge, other facilities (for example, a pool, a tennis court), a neighboring cooperation store, a neighboring cooperation facility outside a hotel, etc., the transceiver machines 23-73, and each terminal unit and a host computer. Data transmission with a neighboring cooperation store and a cooperation facility may go via a public line or Ethernet. Among drawing, a noncontact IC card 10 is carried by the visitor and shows the condition of communicating by each terminal unit and non-contact.

[0019] In each cabin, the door scanner 22 of dedication is formed near the entrance door, the discernment ID of a noncontact IC card is read as mentioned above, and a door lock is controlled to it. Specific terminal units, such as restaurants, such as eating and drinking, a canteen, an exclusive lounge, and a pool, are equipped with the POS registers 34, 44, 54, 64, and 74 besides a scanner, and pay the utilization tariff of a visitor's purchasing or a facility. This is performed by recording the content and the amount of money on the IC card instead of cash. The writing of the point is also performed when a fixed service point is added to a utilization tariff. Since it has a rewritable display in a noncontact IC card, when a visitor wishes rewriting of those displays, it reads in contact to an IC card, and the writing to a card is performed using the equipments (it considers as a "reader writer" below.) 35, 45, 55, 65, and 75 which can be written in.

[0020] Although a host computer 100 serves as a front terminal unit, it has the body 101 of a computer, the database 102, and the transceiver machine 103 grade. It is transmitted to a host computer 100 and all the transmit data from the terminal units 20-90 installed in facilities, such as restaurants, such as a front, a cabin, and eating and drinking, a canteen, a lounge, and a pool, the cooperation store, the cooperation facility, etc. are serially accumulated in a database 102. Moreover, from a host computer 100, the function which calculates or searches the data which should be posted to a visitor's IC card 10 which each terminal unit needs, and answers to each terminal units 30-90 is achieved. The computer 91 installed in the front, the POS register 94, and the card issuance machine 95 are connected with a host computer 100 through a transmitter-receiver 93.

[0021] It is updated based on the data of each purchasing / utilization amount of money in the hotel inside and outside as which the data about the content of reservation of card identity ID, a visitor's name, a visitor's attribute, the content of stay, stay days, a cabin number, a visitor's facilities in a hotel, or a cooperation-hotel outside facility are beforehand stored in a database 102, and are serially inputted into it after that, and the total amount of money and a service point. In addition, the content of stay will mean VIP breakfast and that content on Lady SUPURAN, one night, and the 2nd on one night, two-day breakfast, one night, and the 2nd. Moreover, the activity schedule of play facilities, such as a lounge activity only for visitors, a pool, and a tennis court, is also included in the content of reservation, and the reserved seat number of a baseball field, game start time and the reservation time amount of a means of transportation, the count of utilization of a reserved seat number and a skiing area lift, etc. are contained in the reservation schedule of the facility outside a hotel.

[0022] Drawing 3 and drawing 4 are drawings showing the noncontact IC card with a display function which a visitor carries. Expanded cross-section view drawing [ in / drawing 3 , and / in drawing 4 / the A-A line of drawing 3 ] is shown. [ the top view of a noncontact IC card ] Like drawing 3 , the noncontact IC card 10 with a display function is carrying out the card mold configuration, has the rewritable display 11, has the data transceiver section 13 which becomes a card face from the coil coil connected with the IC chip 12 not appearing at it, and contains the thin cell 14 further as occasion demands. Although the thing of a graphic display is a thing only for non-contact communications, you may be the card of contact mold non-contact mold common use further equipped with the terminal group plate with an external device which contacts and communicates. A display 11 is a magnetic display using magnetic fine particles, or considers as the heat Records Department in which an adjustable display is possible with heat, and it is made to have the alphabetic character of several lines displayed. The proper printing pattern 16 can be given to a card face at the card-face rear face.

[0023] The noncontact IC card 10 with a display function has the base material 15 which consists of a core sheet 151 and an exaggerated sheet 152,153 which protects the table rear face like drawing 4 , and the IC chip 12 and the data transceiver section (antenna coil) 13 are usually formed between the core sheet and the exaggerated sheet. Even if an antenna coil is a coil, it may be formed with the technique of a printed circuit on a core sheet or an exaggerated sheet. The ends of the data transceiver section 13 are connected to the ends child of the IC chip 12. The rewritable display 11 is formed in the crevice 18 which carried out \*\*\*\*\* formation of an exaggerated sheet and the core sheet. The thin cell 14 is formed when not acquiring the power source for chip actuation from an antenna coil, when making the cell concerned build in, needs to form a card base somewhat heavy-gage, and needs to prepare a battery holder. When establishing the printing pattern mentioned above, it is desirable on printing side protection to prepare in the field which becomes the front-face [ of a core sheet ] or core sheet side of an exaggerated sheet.

[0024] Drawing 5 is the block diagram showing the circuitry of IC chip. The situation which is communicating with the external scanners 22-72 is shown. A power circuit 121, the clock extract circuit 122, and the input section of a demodulator 123 are connected to the data transceiver section 13, and each output section is connected to the processing circuit 124. Moreover, the output section of a processing circuit is connected to a modulator 125, the output section of this modulator is connected to the data transceiver section 13, and memory 126 is connected to the processing circuit 124.

[0025] The noncontact IC card 10 with a display function needs to have the memory which can

memorize data, such as the activity amount of money, such as a visitor's name it can communicate by passenger door scanner 22 grade and non-contact as the function, a cabin number, and eating and drinking, among those to be able to write in required data by reader writer 35 grade, and to be able to display them, etc. It is recorded by writing in by contact writing and being displayed based on the data with which the record to a display 11 is made by the reader writer of each terminal reading and by writing in and displaying in the content of memory of a noncontact IC card 10, or the record data to a display 11 are supplied to each terminal from a host computer 100. In the case of the latter, some data which an IC card memorizes are omissible. Usually, since rewriting with a frequent visitor is not needed, in the case of hotel arrival, it supposes that IC card 10 which displayed by writing in in the front is passed to a visitor, and if a noncontact IC card 10 is inserted in a reader writer and a display 11 is rewritten when required, it will be thought that it is enough in the case of a restaurant 30 and canteen 40 grade.

[0026] Next, the case where a display 11 is the magnetic display 111 is explained. Like drawing 4, the crevice 18 for containing a display 11 is formed in a card base. Although this crevice 18 is generally formed of the so-called Zagury processing, it forms the crevice in the exaggerated sheet beforehand, and may form a crevice by carrying out the laminating of this and the core sheet. Drawing 6 is drawing showing the cross section of a magnetic display selectively. Thus, the magnetic display 111 is formed into the formed crevice 18. The magnetic display 111 can be made into the laminated structure equipped with the coloring layer 113 formed on a substrate 112 and this substrate as shown in drawing 6 as that example of 1 configuration, the display layer 114, and the protective layer 116 one by one. The display layer 114 consists of microcapsule 114m and binder 114b, and magnetic powder contains it in microcapsule 114m. In addition, between the display layer 114 and a protective layer 116, the glue line 115 for pasting these up is usually formed.

[0027] A substrate 112 can apply various things, such as various plastics, paper, and a metal plate. It is desirable to use various plastics, especially polyethylene terephthalate especially. As a suitable example of thickness, it is about 100 micrometers. It is formed in order that the coloring layer 113 formed on this substrate 112 may make contrast of a display clear, and the Japanese ink ink usually colored black is used. As a means of other coloring, pigments, such as a barium sulfate, a micro silica, and carbon black, may be kneaded and used for various plastics raw materials. The suitable example of the thickness of this coloring layer 113 is about 2-10 micrometers.

[0028] The display layer 114 prepared on such a coloring layer 113 is equipped with two or more microcapsule 114m and binder 114b. Liquid-like a vehicle and magnetic powder contain in microcapsule 114m, and magnetic powder will be floated in the vehicle. As a vehicle, it is desirable to make a polar liquid, a hydrophobic liquid, and thermoplastics contain.

[0029] As magnetic powder, magnetic powder, such as stainless steels, such as iron, nickel, iron-nickel, and iron-nickel-chromium, an aluminum-cobalt alloy, a samarium-cobalt alloy, and a barium ferrite, is used. As a configuration of magnetic powder, the so-called thing of a flake configuration is desirable, and the thinnest possible thing of thickness that has the large ratio of thickness and particle size is desirable. Particle size is set to about 3-15 micrometers. If particle size becomes large, by relation with the particle size of a capsule, it will not be well contained in a capsule and the reaction to the external MAG will become slow. On the other hand, when particle size became small and you make it magnetized, the difference of the rate of a light reflex in a horizontal direction and a perpendicular direction becomes small, and the contrast at the time of record worsens. The thing more than 500Oe (oersted) is usually used that what is necessary is just to select the coercive force of such magnetic powder suitably by the application of the medium used.

[0030] Furthermore, in a microcapsule, in order to raise contrast, it is desirable to make a color or a pigment contain. 10-100 micrometers is suitable for the particle size of a microcapsule at a volume mean diameter. If this value becomes not much small, since the total amount of the magnetic powder contained in a capsule will decrease, the contrast at the time of record is not enough. On the contrary, if this value becomes large too much, irregularity will be produced on a record layer front face, and a record image will grow into an ununiformity.



[0031] As a binder used for painting such a microcapsule, a microcapsule wall is not damaged, and if coloring layer 113 front face is pasted well, there will be especially no limit. As a more suitable example, hydroxyethyl cellulose, a carboxymethyl cellulose, polyvinyl alcohol, a polyvinyl pyrrolidone, etc. are mentioned. Thickness as a suitable example of the display layer 114 containing such a microcapsule is set to about 200 micrometers.

[0032] On such a display layer 114, a protective layer 116 is formed through a glue line 115. Construction material, such as polyester and an acrylic, is used as a glue line 115. Thickness as a suitable example of such a glue line 115 is set to about 5-10 micrometers. Thickness as a suitable example of a protective layer 116 is set to about 100 micrometers. The magnetic display 111 formed as mentioned above is contained and pasted up into the crevice 18 of said base material 15 by making into a glue line the adhesive layer formed in one side of the substrate 112.

[0033] Drawing 7 is drawing explaining the display condition of a magnetic display. The condition that drawing 7 (A) eliminated the display condition and drawing 7 (B) eliminated the display is shown. If vertical magnetic field  $\phi_{\text{hiv}}$  is applied to the display layer 114 like drawing 7 (A), magnetic powder 117a in microcapsule 114m aligns perpendicularly, the coloring layer 113 will be reached, it will be reflected here, and the incident light  $L_i$  from the outside will produce the reflected light  $L_o$ . In this condition, the color of the coloring layer 113 is viewed as the reflected light. On the other hand, if level magnetic field  $\phi_{\text{hih}}$  is applied to the display layer 114 like drawing 7 (B), magnetic powder 117a in microcapsule 114m aligns horizontally, the coloring layer 113 will be reached, it will be reflected on \*\* and a magnetic powder front face, and the incident light  $L_i$  from the outside will produce the reflected light  $L_o$ . In this condition, the color of magnetic powder 117a is viewed as the reflected light.

[0034] Therefore, vertical in the condition of an external magnetic field, in case a display condition, then a card are horizontally scanned for the dark condition that make this condition into an elimination condition and the coloring layer 113 of drawing 7 (A) is observed, since the reflected light of a bright metal color is observed in the state of drawing 7 (B) - The condition of display-elimination can be continuously formed by making it change that it is level. That is, character representation will be possible if change of an external magnetic field is made ON-OFF based on character code data. Since this magnetic display will be held almost permanently unless other magnetic-recording media are contacted once it is recorded, although a long period of time is attained to, there is especially no need, such as rewriting. In the case of this invention system, the reader writer which produces change of this external magnetic field will be prepared in each terminal unit and a front 90. About such a magnetic display itself, it is indicated by JP,8-90972,A etc., and since it is well-known, the further detailed publication is omitted.

[0035] Next, the case where a display 11 is the heat record display 211 is explained. Although it is the same as that of the case of a magnetic display like drawing 4 that the crevice 18 for containing a display 11 is formed with a card base, in a heat record display, it can be made into a thin layer rather than the case of a magnetic display. Drawing 8 is drawing showing the cross section of a heat record display selectively. Thus, the heat record display 211 is formed into the formed crevice 18. The heat record display 211 is making the laminated structure equipped with the coloring layer 213 formed on the base substrate 212 and this substrate as shown in drawing 8 as that example of 1 configuration, the display layer 214, and the protective layer 216 one by one. A glue line 215 may be formed between a protective layer and a display layer.

[0036] A reversibility thermal recording ingredient can be used for a heat record display. although a reversibility thermal recording ingredient is the transparent matter in an initial state -- constant temperature  $t_0$  higher than ordinary temperature up to -- the part in which the above was heated when it heated and cooled -- becoming cloudy -- ordinary temperature -- high --  $t_2$  [ and ] Low temperature  $t_1$  If it heats and cools, the matter which has the property which becomes transparence will be used. Drawing 9 is drawing showing an example of the property of a reversibility thermal recording ingredient. for example, ordinary temperature -- setting -- permeability  $tr_1$  it is -- a record ingredient -- temperature  $t_0$  exceeding --  $t_1$  up to -- if it heats -- permeability --  $tr_2$  It will be in a transparence condition, and if heating is stopped and natural left [ cool or ], a transparent condition as it is will be held. here -- again --

heating -- t1 exceeding -- t2 up to -- after heating -- cooling -- temperature -- t0 if it is made below -- permeability -- tr1 It will be in a nebula condition. Therefore, a reversibility thermal recording ingredient can be set to tr2 (transparence condition) and tr1 (nebula condition) in ordinary temperature according to the heating past record.

[0037] As such matter, higher fatty acids, such as behenic acid, a lauric acid, and stearin acid, were distributed in macromolecule matrices, such as a vinyl chloride-vinyl acetate copolymer and a vinylidene chloride, and little addition of the surfactant etc. is carried out, for example. Although it can also use it by the layer independent concerned, using since this thermal recording agent layer itself has membrane formation nature, it is possible to form the base substrate 212 in the field by the side of heating of the display layer 214 in the field of the protective layer 216 and opposite hand which consist of thin layers, such as an epoxy resin and silicon resin. Moreover, an indication can be given clear by forming the coloring layer 213.

[0038] It becomes possible to give an indication which can be viewed to record of the heat record layer 211 by changing, energizing and heating character code data by using it for it, as the thermal head of the serial mold which can be heated selectively, for example is stuck to a protective layer 216 by pressure. Also about such a heat record display, it is indicated by JP,3-70977,U, JP,2-50897,A, etc. and is well-known.

[0039] Drawing 10 is an example which shows the content of a display displayed on a display. In drawing 10, the utilization amount of money in a visitor's cabin number, the restaurant in a hotel, etc. and the total amount of money of the event concerned are displayed. Moreover, the accumulating totals of a service point are displayed. the case where there is furthermore reservation of the facility in a hotel, an external cooperation facility, a means of transportation, etc. -- the content of reservation, and a seat number -- or schedule time of day etc. is displayed. A visitor's name is not usually displayed on private maintenance, although recorded on the memory of an IC card. In addition, you may make it display the content of stay, proper advice of hotel inside and outside, etc. since a display 11 cannot read the content of memory directly and cannot display it (without it minds an external device) -- the content of a display -- external reader writer 35- the content written in by 75 and 95 will be held. However, about record in the memory 126, such as the amount of money which the visitor used in the hotel, rewriting is performed each time through scanners 32-72 or the reader writers 35-75.

[0040] Next, the situation of using the hotel service system of this invention is explained. A visitor tells a visitor name, a visitor attribute, the content of stay, the content of reservation (activity of stay days, a dinner, breakfast, and an exclusive lounge etc.), etc. in a front at the time of check-in. If these data are inputted into a computer 91, the cabin number according to the content of stay will be displayed. Also after that, the content of reservation of a cooperation facility or a means of transportation shall be added serially. A front person in charge displays a cabin number etc. on a noncontact IC card with display capabilities by the reader writer 95, and lends the noncontact IC card 10 concerned to a visitor. Moreover, the required contents of stay, such as breakfast, are posted to memory, and especially a display is memorized, although not needed. A visitor receives an IC card and goes to a cabin. In the case of two or more visitors, it is desirable like [ in case a family stays at the same room ] to lend IC card 10 with display capabilities to all the members to the same cabin number, but a representative will add together the settlement of accounts at the time of check-out, and it will be performed. Since the host computer 100 is equipped with the body 101 of a computer, the database 102, and the transceiver machine 103 as mentioned above, it performs data processing about storage of the content of stay, registration of the operating condition of each cabin, a visitor's various purchasing amount of money, and the utilization amount of money, and accumulating-totals service point count, and offers various kinds of data-processing exchange about front operation, such as settlement of accounts of the tariff at the time of check-out.

[0041] If a visitor makes a noncontact IC card approach the door scanner 22 in front of a cabin, a scanner reads the content of data of a visitor's IC card by non-contact, and when the number which the cabin number or Discernment ID recognized from IC card 10, and a scanner memorize is in agreement, it will cancel a door lock. At this time, it is transmitted to a host computer 100 and the data of which the



cabin door lock was canceled are recorded as time of day when the visitor entered the cabin. Since it is similarly recorded when a visitor comes from a cabin outside similarly, it also becomes easy for a front to grasp under a stay of a visitor and going out. Since a card is lost in coincidence of a cabin number and the storage number of a door scanner or there is also a problem of the safety at the time of dropping simply, it is desirable that a door lock is canceled by combination with the discernment ID of a visitor card proper. The tariff settlement of accounts in the case of telephoning the case where a visitor does charged eating and drinking about the ingesta of inside, such as a refrigerator, into a cabin, and the exterior etc. forms a scanner indoors, and you may make it record it on a host computer 100 similarly on real time.

[0042] If a noncontact IC card is made to approach the gate scanner 52 of a lounge when a visitor uses an exclusive lounge, a scanner will cancel a door lock, when the content of data of a visitor's IC card is read by non-contact and it has been recognized that an IC card is a visitor, or when it is the visitor who made a utilization application. Thereby, a visitor becomes available about an exclusive lounge. Therefore, even if persons other than a visitor approach, the door has been closed and cannot use an exclusive lounge. Various kinds of tariffs which the visitor used in the lounge are recorded on an IC card by POS register actuation of a scanner or an official in charge, and the activity amount of money in that case, the activity amount of money of the sum total till then, and an accumulating-totals service point are displayed on the display of an IC card. Thus, the installation to two or more places, such as preparing in a gate part besides near a POS register etc., is possible for a scanner. These functions are the same in other play facilities in a hotel, can eliminate the unapproved utilization of those other than a visitor, and can secure a user's insurance.

[0043] The class of article, the tariff of an article, and service point which purchased the utilization time of a restaurant or a canteen and the POS registers 34 and 44 of a restaurant or the points of sale of an article in the points of sale, such as a class of menu with which the visitor who carries a noncontact IC card 10 ate [ drinking and ] at the restaurant concerned, a tariff of a menu, or a canteen, are inputted by POS register actuation of a scanner or an official in charge. The POS registers 34 and 44 concerned transmit those data to a host computer 100 through the transceiver machines 33 and 43, and addition of the total amount of money of the noncontact IC card 10 concerned is made through the operation and directions of a host computer.

[0044] Settlement of accounts of a tariff will be performed at the time of a visitor's check-out. Since the total amount of money and the accumulating-totals service point of all the amount of money of the amount of money which ate [ drinking and ] in the inside of a hotel, the cooperation store, and the facility, or was purchased and used are displayed on the display 11 of a noncontact IC card, there is no usual case, when the total amount of money turns into the different amount of money from this. The amount of money which added the consumption tax, the service tax, etc. to this total amount of money, and the abatement to an accumulating-totals service point turn into the claim amount of money to a visitor. In the case of the visitor of same-room plurality, a representative will add together and pay as mentioned above. A visitor returns the noncontact IC card 10 with a display function in the front while doing payment of a tariff. A reuse is possible for a noncontact IC card 10 by rewriting.

[0045]

[Example] Hereafter, with reference to drawing 1 - drawing 10 , it explains about the example of this invention.

The noncontact IC card 10 with a display function which a <manufacture of noncontact IC card with display function> visitor carries was manufactured as follows by making a display function into a magnetic display function. By using a polyethylene terephthalate film with a thickness of 25 micrometers as the core sheet 151, while forming the antenna coil (data transceiver section 13) in the one side, IC chip connection terminal was formed. While joining IC chip (64 bytes of memory) terminal to the connection terminal concerned, it connected so that a short circuit might not produce an antenna coil with IC chip connection ends child. The antenna coil formed the aluminum layer with a thickness of 20 micrometers in the front face of a core sheet, and along with the periphery inside of the body section of a card, it is 160 micrometers in line breadth, and photo etching was carried out and it formed this so

that it might remain as a 4 times coil. After carrying out the laminating of the exaggerated sheet (it applies each by 280 micrometers of thickness of an adhesives layer) which applied polyester system adhesives beforehand to the polyethylene terephthalate film with a thickness of 100 micrometers as an exaggerated sheet 152,153, hot press was carried out to both sides of this core sheet, and it considered as the card base to them. In addition, the crevice which carries out invagination of the magnetic display beforehand was formed in the exaggerated sheet by the side of a front face. The card thickness after a press was set to 0.76mm.

[0046] as a magnetic display 111, flake-like barium ferrite magnetism powder (particle size of 6 micrometers) is distributed to the vehicle which consists of ethyl cellulose and an alcoholic solvent -- making -- microcapsule 114m ---izing -- the bottom. This was applied so that it might become 100 micrometers in thickness about polyvinyl alcohol on polyethylene terephthalate film base material 112 front face with a thickness of 80 micrometers which formed the coloring layer 113 black as a binder, and it was made into the magnetic display 111. Besides, the polyester film protective layer 116 with a thickness of 30 micrometers was formed through the glue line 115, and the magnetic display 111 was completed. The magnetic display 111 \*\* concerned was inserted in the crevice of the aforementioned noncontact IC card 10.

[0047] The hotel visitor was made to carry the noncontact IC card 10 with a display function made as an experiment by the <operation [ of a hotel service system ] test> above, and the operation trial was performed. In addition, the Dai Nippon Printing Co., Ltd. make (MCP200ZD) was used for the reader writer of a magnetic display. First, data, such as a visitor name, a cabin number, and the content of stay, were inputted into the noncontact IC card with the card issuance equipment 95 of a front, and the clear display was obtained when written in and displayed on IC card 10. When a visitor approached the door scanner of a cabin number, the door scanner 22 concerned has recognized the cabin number of IC card 10, and the door lock was canceled. When a visitor passed the door scanner 22 first, it was transmitted to the host computer and cabin entrance-into-a-room time of day was recorded on the database 102 of a host computer.

[0048] It totaled per a visitor's cabin number, the body 101 of a host computer performed total operation of the activity amount of money, and the settlement of accounts of a tariff to the activity amount of money stored it in the database 102 by using the result as visitor data. At the time of check-out, the visitor showed the front the noncontact IC card 10 with display capabilities, the comparison with the data of a host computer 100 was made, the toll has been recognized, the accumulating-totals point was considered, and settlement of accounts of a tariff was performed.

[0049]

[Effect of the Invention] Since \*\* visitor is carrying above the noncontact IC card with a data display function which can communicate by each terminal unit in a hotel, and non-contact like a detailed description according to the hotel service system of this invention, each terminal unit can perform control of passenger door closing motion of the hotel concerned, entrance management of the lounge only for visitors, etc. based on the cabin number which the noncontact IC card concerned holds, and can secure the safety in a hotel.

\*\* The noncontact IC card concerned can adjust purchasing in a hotel, utilization of a facility, purchasing in a cooperation-hotel outside store or a facility, and utilization with a cashless payment, and risk of being because it walking around with cash does not follow again. Moreover, since purchasing and the sum total of the utilization amount of money of a facility are displayed on a display, it does not pay more than the budget amount of money.

\*\* Since a service point is manageable to the utilization amount of money of purchasing in hotel inside and outside, or a facility, discount settlement of accounts according to a service point can be performed at the time of check-out, and purchasing in a hotel and utilization of a cooperation store and a cooperation facility are promoted.

\*\* Since they can be displayed on the display of a card when the case where there is seat assignment like a baseball field, a soccer stadium, or a cooperation means of transportation, and time amount are specified, a visitor does not mistake.

**\*\* Since a visitor can process eating and drinking of hotel inside and outside, and all settlement of accounts of purchasing / utilization amount of money of an article in the front of a hotel, don't trouble to the time and effort of payment of serial. Moreover, the profit by the service point is also obtained. Furthermore, the noncontact IC card with a display function of this invention can demonstrate sufficient function for utilization by such system.**

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[Translation done.]

## TECHNICAL FIELD

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[Industrial Application] A visitor is made to carry the IC card concerned in this invention about the noncontact IC card with display capabilities used for the service system of the facility in a hotel using a noncontact IC card with display capabilities, or a cooperation store and a cooperation facility, and it. Therefore, the facility and the skiing area which ties up of the pool in a hotel or a tennis court, a golf course, a theme park, a baseball field, a soccer stadium, a movie theater, etc. make it possible further to attain cashless payment-ization of shopping in using it as a room key, a restaurant and a lounge, a canteen, or the cooperation store of the hotel address neighborhood, or facility utilization, and to put in block the reservation display of a cooperation means of transportation etc., and to perform it. Much more improvement in service can be aimed at carrying out non-contact communication with various terminals unlike the conventional contact smart card, and making R/W possible, and by giving display capabilities.

## PRIOR ART

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[Description of the Prior Art] Conventionally, in hotel operation, the technique of using a magnetic card or an IC card is introduced. For example, at JP,58-51593,B, rationalizing key management is performed by using a card key instead of a mechanical key as a key of a cabin. For example, if a user proposes to a front, a front person in charge will display a cabin number, the number of stays, etc. on a card, and will hand a user. Using the received card, a user cancels the door lock of a cabin and uses a cabin.

[0003] Moreover, rationalizing using a card is various line crack \*\*\*\*\* also to the settlement-of-accounts approach of a utilization tariff. For example, member registration is carried out beforehand and a member card is received. A member card is made to read into the reception device in a hotel, and a utilization application is made by injecting imprest. And it is the system that a reception device gives the function of a key to a member card by imprest payment.

[0004] The system which carries out uninhabited automation of all the operation, such as key management and tariff settlement of accounts, collectively to automation or the system made semi-automatic using a card key independently about each operation in these hotels is also proposed by JP,8-202776,A. However, although the system indicated by this official report is a system aiming at full full automation of a hotel, it is not necessarily realistic. Moreover, although what used the IC card for the card key is proposed, since it cannot communicate with a terminal unit by non-contact, on the occasion of the entrance into a room to a cabin, it takes time and effort which inserts a card key in the gating arrangement of a door. Moreover, although it is, a proposal, now the systems including those functions which can be used synthetically in the cooperation facility and cooperation store in a hotel and outside a hotel are not proposed for the application used for each systems, a card key, cashless-payment-izing, i.e., the costs settlement of accounts by the card etc., etc. Moreover, giving a visitor a privilege by service point addition of points is not taken into consideration, either. Therefore, the system of the conventional proposal had turned into an unsatisfactory system, in order to aim at rationalization of hotel operation, and broad service.

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[Translation done.]

## EFFECT OF THE INVENTION

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[Effect of the Invention] Since \*\* visitor is carrying above the noncontact IC card with a data display function which can communicate by each terminal unit in a hotel, and non-contact like a detailed description according to the hotel service system of this invention, each terminal unit can perform control of passenger door closing motion of the hotel concerned, entrance management of the lounge only for visitors, etc. based on the cabin number which the noncontact IC card concerned holds, and can secure the safety in a hotel.

\*\* The noncontact IC card concerned can adjust purchasing in a hotel, utilization of a facility, purchasing in a cooperation-hotel outside store or a facility, and utilization with a cashless payment, and risk of being because it walking around with cash does not follow again. Moreover, since purchasing and the sum total of the utilization amount of money of a facility are displayed on a display, it does not pay more than the budget amount of money.

\*\* Since a service point is manageable to the utilization amount of money of purchasing in hotel inside and outside, or a facility, discount settlement of accounts according to a service point can be performed at the time of check-out, and purchasing in a hotel and utilization of a cooperation store and a cooperation facility are promoted.

\*\* Since they can be displayed on the display of a card when the case where there is seat assignment like a baseball field, a soccer stadium, or a cooperation means of transportation, and time amount are specified, a visitor does not mistake.

\*\* Since a visitor can process eating and drinking of hotel inside and outside, and all settlement of accounts of purchasing / utilization amount of money of an article in the front of a hotel, don't trouble to the time and effort of payment of serial. Moreover, the profit by the service point is also obtained.

Furthermore, the noncontact IC card with a display function of this invention can demonstrate sufficient function for utilization by such system.

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[Translation done.]

## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] Then, the object of this invention is as follows. Give the reservation functions and service point function managers including the inside of a hotel and a cooperation store, and a cooperation facility of cashless-payment-izing or various facilities including the visitor in the above hotels etc., or the problem on cabin management, let a visitor carry a noncontact IC card with a display function, and enable the entrance into a room to a cabin by non-contact with the noncontact IC card concerned. Things. Further, display a cabin number, purchasing / utilization amount of money, etc. on the display of an IC card, make a visitor easy to use and make easy cashless-payment-izing payment of the various tariffs in a hotel, raising service, a visitor, a cabin and facility management, or administration.

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[Translation done.]

## MEANS

[Means for Solving the Problem] The 1st of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. The noncontact IC card with display capabilities concerned The function as a \*\* cabin room key, \*\* The cashless payment settlement-of-accounts function in the canteen in a hotel and a restaurant, a facility and a cooperation-hotel outside store, and a cooperation facility, \*\* Be in the hotel service system using the noncontact IC card with display capabilities characterized by having the reservation display capabilities in attachment and a cooperation facility, and a cooperation means of transportation, and the service point management display capabilities to purchasing / utilization amount of money of \*\* hotel inside and outside. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0007] The 2nd of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. The noncontact IC card with a display function concerned has the information Records Department and the information-display section. In \*\* information Records Department Card identity ID, a visitor name, a cabin number, the canteen in a hotel and a restaurant, The content of reservation of the service point to purchasing / utilization amount of money in a facility, a cooperation-hotel outside store, and a cooperation facility, those total amount of money, and purchasing / utilization amount of money and a hotel inside-and-outside facility, or a cooperation means of transportation is recorded, In the information-display section, \*\* A cabin number, the canteen in a hotel and a restaurant, a cooperation-hotel outside store, The content of reservation of the service point to purchasing / utilization amount of money, those total amount of money, and purchasing / utilization amount of money and hotel inside-and-outside facility in a cooperation facility, or a cooperation means of transportation writes in by the reader writer, and is displayed, It is in the hotel service system using the noncontact IC card with display capabilities by which it is characterized. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0008] The 3rd of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel, and the noncontact IC card with display capabilities concerned displays a cabin number on \*\* display, \*\* By making the noncontact IC card concerned approach the door scanner of the above-mentioned cabin number It is in the hotel service system using the noncontact IC card with display capabilities characterized by that a cabin door lock is canceled and transmitting and recording \*\* visitor's entrance situation on a host computer. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0009] The 4th of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. Purchasing and the facility in hotel inside and outside [ noncontact IC card / concerned / with a display function / Records Department / \*\* ], The content of purchasing / utilization in the utilization time of a cooperation means of transportation, its amount of money, those total amount of money, and the service point to purchasing and utilization are serially recorded through a scanner or a POS register, \*\* The service point to purchasing / utilization amount of money in the utilization time of purchasing in hotel inside and outside, a facility, and a cooperation means of transportation, those total amount of money, and purchasing / utilization amount of money writes in a display by the reader writer, and is displayed on it, \*\* that purchasing / utilization amount of money in purchasing in hotel inside and outside or the utilization time of a facility and those total amount of money are transmitted and recorded on a host computer, and \*\* -- with the record data of the host computer concerned It is in the hotel service system using the noncontact IC card with display capabilities characterized by performing settlement of accounts of the tariff at the time of check-out. Rationalization of operation can be attained while the service to a visitor improves, since it is this



service system.

[0010] The 5th of the summary of the hotel service system of this invention for solving the above-mentioned technical problem It is the system which a visitor is made to carry a noncontact IC card with display capabilities, and serves a hotel. Utilization reservation of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation is recorded for the noncontact IC card with a display function concerned on \*\* Records Department, \*\* Utilization reservation of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation is displayed on a display, \*\* that the contents of utilization and those total amount of money of the facility in a hotel, a cooperation-hotel outside facility, and a cooperation means of transportation are transmitted and recorded on a host computer, and \*\* -- be in settlement of accounts of the tariff at the time of check-out being performed with the record data of the host computer concerned. Rationalization of operation can be attained while the service to a visitor improves, since it is this service system.

[0011] It is characterized by being the magnetic display by which it is the noncontact IC card with display capabilities used for the hotel service system of the summary of the noncontact IC card of this invention for solving the above-mentioned technical problem according to claim 5 from 1st claim 1, and the display which the function of transmitting and receiving data by non-contact operates considering a thin cell and/or an electric wave as a power source, is equipped with a control section and storage memory, and displays required data etc. is rewritten by the external device. Since it is this noncontact IC card, purchasing / utilization amount of money in hotel inside and outside etc. can be certainly displayed possible [ data communication ] by non-contact.

[0012] It is characterized by being the heat record display by which it is the noncontact IC card with display capabilities used for the hotel service system of the summary of the noncontact IC card of this invention for solving the above-mentioned technical problem according to claim 5 from 2nd claim 1, and the display which the function of transmitting and receiving data by non-contact operates considering a thin cell and/or an electric wave as a power source, is equipped with a control section and storage memory, and displays required data etc. is rewritten by the external device. Since it is this noncontact IC card, purchasing / utilization amount of money in hotel inside and outside etc. can be certainly displayed possible [ data communication ] by non-contact.

[0013]

[Embodiment of the Invention] Drawing 1 is the whole block diagram showing the hotel service system of this invention. In the hotel service system of this invention, a visitor carries the noncontact IC card 10 with a display function, respectively. In case a visitor is check-in, the noncontact IC card with display capabilities concerned inputs card identity ID, a visitor's name, a cabin number, the content of stay, etc., and is published in the front. When it turns out beforehand that the facility, cooperation facility, or cooperation means of transportation in a hotel is used, those contents of reservation are also inputted. A front is equipped with the personal computer 91 besides card issuance equipment 95, and POS register 94 grade. The data of the POS register installed in a host computer 100, the door scanner 22 installed in the door of each cabin, a canteen, a restaurant, a lounge, the facility in a hotel (for example, a pool, a tennis court), cooperation-hotel outside facilities (for example, a skiing area, a baseball field, a golf course, a theme park, etc.), a neighboring cooperation store, etc. and a scanner are transmitted to a host computer through a transmitter-receiver. A visitor arrives and the visitor information which IC card 10 was published and was inputted is also promptly transmitted to each cabin 20 through a host computer 100.

[0014] The scanners 22-72 installed in a passenger door or each facility send out ringing, if a noncontact IC card 10 approaches. Since an IC card sends out the data which emit and hold a reply signal in response to it if ringing is sensed, a scanner can read the data. Moreover, a scanner can write information in a noncontact IC card 10 if needed. For example, if the information which the visitor reached is transmitted to the door scanner 22 of the cabin number concerned corresponding to card identity ID which the host computer inputted in the front, the door scanner 22 will cancel a door lock, after checking coincidence with the discernment ID which has sensed the discernment ID and was transmitted from the host computer, if IC card 10 approaches. When a visitor passes a door scanner first,

the signal is transmitted to a host computer 100, and a host computer records cabin entrance-into-a-room time of day. Henceforth, a staying-in-the-room situation is serially transmitted with close leaving of a visitor.

[0015] The utilization amount of money and the service point information accompanying utilization are transmitted to a host computer at the same time Shinsei of the card concerned is recognized in a scanner 32 and 42 grades and the utilization amount of money is inputted into the POS registers 34 and 44, when a visitor uses the noncontact IC card 10 concerned as a card for cashless payment settlement of accounts at a canteen, a restaurant, etc. Although it can write in from a scanner also to the Records Department of a card, writing may be recorded through the card reader writer linking directly to a POS register. The equipment which inserts and records a card on a reader writer also to a noncontact IC card without a contact terminal is used, and record in card memory and the writing to a card display will be performed by the reader writer concerned.

[0016] When a visitor uses the facilities in a hotel (a pool, tennis court, etc.), a neighboring baseball field, a skiing area, a golf course, a theme park, and other cooperation facilities and cooperation means of transportation, the contents of reservation, such as reservation time of day, and a reserved seat, utilization time, are beforehand recorded on the IC card, and it is displayed on the display of a card. Moreover, a visitor's information is transmitted to the scanner 62 and you may enable it to pass through the gate. It can make it possible to pass the number of predetermined times in the case of the lift ticket counter of a skiing area etc. The content of utilization, the utilization amount of money, and the service point information accompanying utilization are transmitted to a host computer 100 at the same time the content of utilization and the utilization amount of money are inputted into the POS register 64, when a visitor finishes using those facilities.

[0017] The content of utilization, the utilization amount of money, and the service point information accompanying utilization are transmitted to a host computer at the same time the content of utilization and the utilization amount of money are inputted into the POS register 74 when a visitor uses the cooperation store of the hotel neighborhood, and a visitor uses those cooperation stores. Record to a noncontact IC card 10 and the display writing to a display can also be made to be the same as that of the case in a hotel. The host computer 100 is storing the data from these every place, totals the accumulating totals of the service point accompanying a visitor's total utilization amount of money and utilization, and transmits the data concerned to a front 90 in the case of check-out. In case a visitor checks out, when settlement of accounts is carried out based on the total utilization amount of money and there is a service point, abatement of the amount of money corresponding to the accumulating-totals point is carried out, or other services are offered.

[0018] Drawing 2 is drawing showing the data communication system in a hotel service system. Like drawing 2, the communication system of the hotel service system of this invention consists of data circuit 110 grades which connect each terminal units 20-70 installed in restaurants, such as the noncontact IC card 10 with a display function, the host computer 100 and front which a visitor carries, a cabin, and eating and drinking, a canteen, a lounge, other facilities (for example, a pool, a tennis court), a neighboring cooperation store, a neighboring cooperation facility outside a hotel, etc., the transceiver machines 23-73, and each terminal unit and a host computer. Data transmission with a neighboring cooperation store and a cooperation facility may go via a public line or Ethernet. Among drawing, a noncontact IC card 10 is carried by the visitor and shows the condition of communicating by each terminal unit and non-contact.

[0019] In each cabin, the door scanner 22 of dedication is formed near the entrance door, the discernment ID of a noncontact IC card is read as mentioned above, and a door lock is controlled to it. Specific terminal units, such as restaurants, such as eating and drinking, a canteen, an exclusive lounge, and a pool, are equipped with the POS registers 34, 44, 54, 64, and 74 besides a scanner, and pay the utilization tariff of a visitor's purchasing or a facility. This is performed by recording the content and the amount of money on the IC card instead of cash. The writing of the point is also performed when a fixed service point is added to a utilization tariff. Since it has a rewritable display in a noncontact IC card, when a visitor wishes rewriting of those displays, it reads in contact to an IC card, and the writing to a

card is performed using the equipments (it considers as a "reader writer" below.) 35, 45, 55, 65, and 75 which can be written in.

[0020] Although a host computer 100 serves as a front terminal unit, it has the body 101 of a computer, the database 102, and the transceiver machine 103 grade. It is transmitted to a host computer 100 and all the transmit data from the terminal units 20-90 installed in facilities, such as restaurants, such as a front, a cabin, and eating and drinking, a canteen, a lounge, and a pool, the cooperation store, the cooperation facility, etc. are serially accumulated in a database 102. Moreover, from a host computer 100, the function which calculates or searches the data which should be posted to a visitor's IC card 10 which each terminal unit needs, and answers to each terminal units 30-90 is achieved. The computer 91 installed in the front, the POS register 94, and the card issuance machine 95 are connected with a host computer 100 through a transmitter-receiver 93.

[0021] It is updated based on the data of each purchasing / utilization amount of money in the hotel inside and outside as which the data about the content of reservation of card identity ID, a visitor's name, a visitor's attribute, the content of stay, stay days, a cabin number, a visitor's facilities in a hotel, or a cooperation-hotel outside facility are beforehand stored in a database 102, and are serially inputted into it after that, and the total amount of money and a service point. In addition, the content of stay will mean VIP breakfast and that content on Lady SUPURAN, one night, and the 2nd on one night, two-day breakfast, one night, and the 2nd. Moreover, the activity schedule of play facilities, such as a lounge activity only for visitors, a pool, and a tennis court, is also included in the content of reservation, and the reserved seat number of a baseball field, game start time and the reservation time amount of a means of transportation, the count of utilization of a reserved seat number and a skiing area lift, etc. are contained in the reservation schedule of the facility outside a hotel.

[0022] Drawing 3 and drawing 4 are drawings showing the noncontact IC card with a display function which a visitor carries. Expanded cross-section view drawing [ in / drawing 3 , and / in drawing 4 / the A-A line of drawing 3 ] is shown. [ the top view of a noncontact IC card ] Like drawing 3 , the noncontact IC card 10 with a display function is carrying out the card mold configuration, has the rewritable display 11, has the data transceiver section 13 which becomes a card face from the coil coil connected with the IC chip 12 not appearing at it, and contains the thin cell 14 further as occasion demands. Although the thing of a graphic display is a thing only for non-contact communications, you may be the card of contact mold non-contact mold common use further equipped with the terminal group plate with an external device which contacts and communicates. A display 11 is a magnetic display using magnetic fine particles, or considers as the heat Records Department in which an adjustable display is possible with heat, and it is made to have the alphabetic character of several lines displayed. The proper printing pattern 16 can be given to a card face at the card-face rear face.

[0023] The noncontact IC card 10 with a display function has the base material 15 which consists of a core sheet 151 and an exaggerated sheet 152,153 which protects the table rear face like drawing 4 , and the IC chip 12 and the data transceiver section (antenna coil) 13 are usually formed between the core sheet and the exaggerated sheet. Even if an antenna coil is a coil, it may be formed with the technique of a printed circuit on a core sheet or an exaggerated sheet. The ends of the data transceiver section 13 are connected to the ends child of the IC chip 12. The rewritable display 11 is formed in the crevice 18 which carried out \*\*\*\*\* formation of an exaggerated sheet and the core sheet. The thin cell 14 is formed when not acquiring the power source for chip actuation from an antenna coil, when making the cell concerned build in, needs to form a card base somewhat heavy-gage, and needs to prepare a battery holder. When establishing the printing pattern mentioned above, it is desirable on printing side protection to prepare in the field which becomes the front-face [ of a core sheet ] or core sheet side of an exaggerated sheet.

[0024] Drawing 5 is the block diagram showing the circuitry of IC chip. The situation which is communicating with the external scanners 22-72 is shown. A power circuit 121, the clock extract circuit 122, and the input section of a demodulator 123 are connected to the data transceiver section 13, and each output section is connected to the processing circuit 124. Moreover, the output section of a processing circuit is connected to a modulator 125, the output section of this modulator is connected to

the data transceiver section 13, and memory 126 is connected to the processing circuit 124.

[0025] The noncontact IC card 10 with a display function needs to have the memory which can memorize data, such as the activity amount of money, such as a visitor's name it can communicate by passenger door scanner 22 grade and non-contact as the function, a cabin number, and eating and drinking, among those to be able to write in required data by reader writer 35 grade, and to be able to display them, etc. It is recorded by writing in by contact writing and being displayed based on the data with which the record to a display 11 is made by the reader writer of each terminal reading and by writing in and displaying in the content of memory of a noncontact IC card 10, or the record data to a display 11 are supplied to each terminal from a host computer 100. In the case of the latter, some data which an IC card memorizes are omissible. Usually, since rewriting with a frequent visitor is not needed, in the case of hotel arrival, it supposes that IC card 10 which displayed by writing in in the front is passed to a visitor, and if a noncontact IC card 10 is inserted in a reader writer and a display 11 is rewritten when required, it will be thought that it is enough in the case of a restaurant 30 and canteen 40 grade.

[0026] Next, the case where a display 11 is the magnetic display 111 is explained. Like drawing 4, the crevice 18 for containing a display 11 is formed in a card base. Although this crevice 18 is generally formed of the so-called Zagury processing, it forms the crevice in the exaggerated sheet beforehand, and may form a crevice by carrying out the laminating of this and the core sheet. Drawing 6 is drawing showing the cross section of a magnetic display selectively. Thus, the magnetic display 111 is formed into the formed crevice 18. The magnetic display 111 can be made into the laminated structure equipped with the coloring layer 113 formed on a substrate 112 and this substrate as shown in drawing 6 as that example of 1 configuration, the display layer 114, and the protective layer 116 one by one. The display layer 114 consists of microcapsule 114m and binder 114b, and magnetic powder contains it in microcapsule 114m. In addition, between the display layer 114 and a protective layer 116, the glue line 115 for pasting these up is usually formed.

[0027] A substrate 112 can apply various things, such as various plastics, paper, and a metal plate. It is desirable to use various plastics, especially polyethylene terephthalate especially. As a suitable example of thickness, it is about 100 micrometers. It is formed in order that the coloring layer 113 formed on this substrate 112 may make contrast of a display clear, and the Japanese ink ink usually colored black is used. As a means of other coloring, pigments, such as a barium sulfate, a micro silica, and carbon black, may be kneaded and used for various plastics raw materials. The suitable example of the thickness of this coloring layer 113 is about 2-10 micrometers.

[0028] The display layer 114 prepared on such a coloring layer 113 is equipped with two or more microcapsule 114m and binder 114b. Liquid-like a vehicle and magnetic powder contain in microcapsule 114m, and magnetic powder will be floated in the vehicle. As a vehicle, it is desirable to make a polar liquid, a hydrophobic liquid, and thermoplastics contain.

[0029] As magnetic powder, magnetic powder, such as stainless steels, such as iron, nickel, iron-nickel, and iron-nickel-chromium, an aluminum-cobalt alloy, a samarium-cobalt alloy, and a barium ferrite, is used. As a configuration of magnetic powder, the so-called thing of a flake configuration is desirable, and the thinnest possible thing of thickness that has the large ratio of thickness and particle size is desirable. Particle size is set to about 3-15 micrometers. If particle size becomes large, by relation with the particle size of a capsule, it will not be well contained in a capsule and the reaction to the external MAG will become slow. On the other hand, when particle size became small and you make it magnetized, the difference of the rate of a light reflex in a horizontal direction and a perpendicular direction becomes small, and the contrast at the time of record worsens. The thing more than 500Oe (oersted) is usually used that what is necessary is just to select the coercive force of such magnetic powder suitably by the application of the medium used.

[0030] Furthermore, in a microcapsule, in order to raise contrast, it is desirable to make a color or a pigment contain. 10-100 micrometers is suitable for the particle size of a microcapsule at a volume mean diameter. If this value becomes not much small, since the total amount of the magnetic powder contained in a capsule will decrease, the contrast at the time of record is not enough. On the contrary, if

this value becomes large too much, irregularity will be produced on a record layer front face, and a record image will grow into an ununiformity.

[0031] As a binder used for painting such a microcapsule, a microcapsule wall is not damaged, and if coloring layer 113 front face is pasted well, there will be especially no limit. As a more suitable example, hydroxyethyl cellulose, a carboxymethyl cellulose, polyvinyl alcohol, a polyvinyl pyrrolidone, etc. are mentioned. Thickness as a suitable example of the display layer 114 containing such a microcapsule is set to about 200 micrometers.

[0032] On such a display layer 114, a protective layer 116 is formed through a glue line 115. Construction material, such as polyester and an acrylic, is used as a glue line 115. Thickness as a suitable example of such a glue line 115 is set to about 5-10 micrometers. Thickness as a suitable example of a protective layer 116 is set to about 100 micrometers. The magnetic display 111 formed as mentioned above is contained and pasted up into the crevice 18 of said base material 15 by making into a glue line the adhesive layer formed in one side of the substrate 112.

[0033] Drawing 7 is drawing explaining the display condition of a magnetic display. The condition that drawing 7 (A) eliminated the display condition and drawing 7 (B) eliminated the display is shown. If vertical magnetic field  $\phi_{\text{v}}$  is applied to the display layer 114 like drawing 7 (A), magnetic powder 117a in microcapsule 114m aligns perpendicularly, the coloring layer 113 will be reached, it will be reflected here, and the incident light  $L_i$  from the outside will produce the reflected light  $L_o$ . In this condition, the color of the coloring layer 113 is viewed as the reflected light. On the other hand, if level magnetic field  $\phi_{\text{h}}$  is applied to the display layer 114 like drawing 7 (B), magnetic powder 117a in microcapsule 114m aligns horizontally, the coloring layer 113 will be reached, it will be reflected on \*\* and a magnetic powder front face, and the incident light  $L_i$  from the outside will produce the reflected light  $L_o$ . In this condition, the color of magnetic powder 117a is viewed as the reflected light.

[0034] Therefore, vertical in the condition of an external magnetic field, in case a display condition, then a card are horizontally scanned for the dark condition that make this condition into an elimination condition and the coloring layer 113 of drawing 7 (A) is observed, since the reflected light of a bright metal color is observed in the state of drawing 7 (B) - The condition of display-elimination can be continuously formed by making it change that it is level. That is, character representation will be possible if change of an external magnetic field is made ON-OFF based on character code data. Since this magnetic display will be held almost permanently unless other magnetic-recording media are contacted once it is recorded, although a long period of time is attained to, there is especially no need, such as rewriting. In the case of this invention system, the reader writer which produces change of this external magnetic field will be prepared in each terminal unit and a front 90. About such a magnetic display itself, it is indicated by JP,8-90972,A etc., and since it is well-known, the further detailed publication is omitted.

[0035] Next, the case where a display 11 is the heat record display 211 is explained. Although it is the same as that of the case of a magnetic display like drawing 4 that the crevice 18 for containing a display 11 is formed with a card base, in a heat record display, it can be made into a thin layer rather than the case of a magnetic display. Drawing 8 is drawing showing the cross section of a heat record display selectively. Thus, the heat record display 211 is formed into the formed crevice 18. The heat record display 211 is making the laminated structure equipped with the coloring layer 213 formed on the base substrate 212 and this substrate as shown in drawing 8 as that example of 1 configuration, the display layer 214, and the protective layer 216 one by one. A glue line 215 may be formed between a protective layer and a display layer.

[0036] A reversibility thermal recording ingredient can be used for a heat record display. although a reversibility thermal recording ingredient is the transparent matter in an initial state -- constant temperature  $t_0$  higher than ordinary temperature up to -- the part in which the above was heated when it heated and cooled -- becoming cloudy -- ordinary temperature -- high --  $t_2$  [ and ] Low temperature  $t_1$  If it heats and cools, the matter which has the property which becomes transparence will be used. Drawing 9 is drawing showing an example of the property of a reversibility thermal recording ingredient. for example, ordinary temperature -- setting -- permeability  $tr_1$  it is -- a record ingredient -- temperature  $t_0$

exceeding -- t1 up to -- if it heats -- permeability -- tr2 It will be in a transparence condition, and if heating is stopped and natural left [ cool or ], a transparent condition as it is will be held. here -- again -- heating -- t1 exceeding -- t2 up to -- after heating -- cooling -- temperature -- t0 if it is made below -- permeability -- tr1 It will be in a nebula condition. Therefore, a reversibility thermal recording ingredient can be set to tr2 (transparence condition) and tr1 (nebula condition) in ordinary temperature according to the heating past record.

[0037] As such matter, higher fatty acids, such as behenic acid, a lauric acid, and stearin acid, were distributed in macromolecule matrices, such as a vinyl chloride-vinyl acetate copolymer and a vinylidene chloride, and little addition of the surfactant etc. is carried out, for example. Although it can also use it by the layer independent concerned, using since this thermal recording agent layer itself has membrane formation nature, it is possible to form the base substrate 212 in the field by the side of heating of the display layer 214 in the field of the protective layer 216 and opposite hand which consist of thin layers, such as an epoxy resin and silicon resin. Moreover, an indication can be given clear by forming the coloring layer 213.

[0038] It becomes possible to give an indication which can be viewed to record of the heat record layer 211 by changing, energizing and heating character code data by using it for it, as the thermal head of the serial mold which can be heated selectively, for example is stuck to a protective layer 216 by pressure. Also about such a heat record display, it is indicated by JP,3-70977,U, JP,2-50897,A, etc. and is well-known.

[0039] Drawing 10 is an example which shows the content of a display displayed on a display. In drawing 10, the utilization amount of money in a visitor's cabin number, the restaurant in a hotel, etc. and the total amount of money of the event concerned are displayed. Moreover, the accumulating totals of a service point are displayed. the case where there is furthermore reservation of the facility in a hotel, an external cooperation facility, a means of transportation, etc. -- the content of reservation, and a seat number -- or schedule time of day etc. is displayed. A visitor's name is not usually displayed on private maintenance, although recorded on the memory of an IC card. In addition, you may make it display the content of stay, proper advice of hotel inside and outside, etc. since a display 11 cannot read the content of memory directly and cannot display it (without it minds an external device) -- the content of a display -- external reader writer 35- the content written in by 75 and 95 will be held. However, about record in the memory 126, such as the amount of money which the visitor used in the hotel, rewriting is performed each time through scanners 32-72 or the reader writers 35-75.

[0040] Next, the situation of using the hotel service system of this invention is explained. A visitor tells a visitor name, a visitor attribute, the content of stay, the content of reservation (activity of stay days, a dinner, breakfast, and an exclusive lounge etc.), etc. in a front at the time of check-in. If these data are inputted into a computer 91, the cabin number according to the content of stay will be displayed. Also after that, the content of reservation of a cooperation facility or a means of transportation shall be added serially. A front person in charge displays a cabin number etc. on a noncontact IC card with display capabilities by the reader writer 95, and lends the noncontact IC card 10 concerned to a visitor. Moreover, the required contents of stay, such as breakfast, are posted to memory, and especially a display is memorized, although not needed. A visitor receives an IC card and goes to a cabin. In the case of two or more visitors, it is desirable like [ in case a family stays at the same room ] to lend IC card 10 with display capabilities to all the members to the same cabin number, but a representative will add together the settlement of accounts at the time of check-out, and it will be performed. Since the host computer 100 is equipped with the body 101 of a computer, the database 102, and the transceiver machine 103 as mentioned above, it performs data processing about storage of the content of stay, registration of the operating condition of each cabin, a visitor's various purchasing amount of money, and the utilization amount of money, and accumulating-totals service point count, and offers various kinds of data-processing exchange about front operation, such as settlement of accounts of the tariff at the time of check-out.

[0041] If a visitor makes a noncontact IC card approach the door scanner 22 in front of a cabin, a scanner reads the content of data of a visitor's IC card by non-contact, and when the number which the



cabin number or Discernment ID recognized from IC card 10, and a scanner memorize is in agreement, it will cancel a door lock. At this time, it is transmitted to a host computer 100 and the data of which the cabin door lock was canceled are recorded as time of day when the visitor entered the cabin. Since it is similarly recorded when a visitor comes from a cabin outside similarly, it also becomes easy for a front to grasp under a stay of a visitor and going out. Since a card is lost in coincidence of a cabin number and the storage number of a door scanner or there is also a problem of the safety at the time of dropping simply, it is desirable that a door lock is canceled by combination with the discernment ID of a visitor card proper. The tariff settlement of accounts in the case of telephoning the case where a visitor does charged eating and drinking about the ingesta of inside, such as a refrigerator, into a cabin, and the exterior etc. forms a scanner indoors, and you may make it record it on a host computer 100 similarly on real time.

[0042] If a noncontact IC card is made to approach the gate scanner 52 of a lounge when a visitor uses an exclusive lounge, a scanner will cancel a door lock, when the content of data of a visitor's IC card is read by non-contact and it has been recognized that an IC card is a visitor, or when it is the visitor who made a utilization application. Thereby, a visitor becomes available about an exclusive lounge. Therefore, even if persons other than a visitor approach, the door has been closed and cannot use an exclusive lounge. Various kinds of tariffs which the visitor used in the lounge are recorded on an IC card by POS register actuation of a scanner or an official in charge, and the activity amount of money in that case, the activity amount of money of the sum total till then, and an accumulating-totals service point are displayed on the display of an IC card. Thus, the installation to two or more places, such as preparing in a gate part besides near a POS register etc., is possible for a scanner. These functions are the same in other play facilities in a hotel, can eliminate the unapproved utilization of those other than a visitor, and can secure a user's insurance.

[0043] The class of article, the tariff of an article, and service point which purchased the utilization time of a restaurant or a canteen and the POS registers 34 and 44 of a restaurant or the points of sale of an article in the points of sale, such as a class of menu with which the visitor who carries a noncontact IC card 10 ate [ drinking and ] at the restaurant concerned, a tariff of a menu, or a canteen, are inputted by POS register actuation of a scanner or an official in charge. The POS registers 34 and 44 concerned transmit those data to a host computer 100 through the transceiver machines 33 and 43, and addition of the total amount of money of the noncontact IC card 10 concerned is made through the operation and directions of a host computer.

[0044] Settlement of accounts of a tariff will be performed at the time of a visitor's check-out. Since the total amount of money and the accumulating-totals service point of all the amount of money of the amount of money which ate [ drinking and ] in the inside of a hotel, the cooperation store, and the facility, or was purchased and used are displayed on the display 11 of a noncontact IC card, there is no usual case, when the total amount of money turns into the different amount of money from this. The amount of money which added the consumption tax, the service tax, etc. to this total amount of money, and the abatement to an accumulating-totals service point turn into the claim amount of money to a visitor. In the case of the visitor of same-room plurality, a representative will add together and pay as mentioned above. A visitor returns the noncontact IC card 10 with a display function in the front while doing payment of a tariff. A reuse is possible for a noncontact IC card 10 by rewriting.

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[Translation done.]

## EXAMPLE

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[Example] Hereafter, with reference to drawing 1 - drawing 10 , it explains about the example of this invention.

The noncontact IC card 10 with a display function which a <manufacture of noncontact IC card with display function> visitor carries was manufactured as follows by making a display function into a magnetic display function. By using a polyethylene terephthalate film with a thickness of 25 micrometers as the core sheet 151, while forming the antenna coil (data transceiver section 13) in the one side, IC chip connection terminal was formed. While joining IC chip (64 bytes of memory) terminal to the connection terminal concerned, it connected so that a short circuit might not produce an antenna coil with IC chip connection ends child. The antenna coil formed the aluminum layer with a thickness of 20 micrometers in the front face of a core sheet, and along with the periphery inside of the body section of a card, it is 160 micrometers in line breadth, and photo etching was carried out and it formed this so that it might remain as a 4 times coil. After carrying out the laminating of the exaggerated sheet (it applies each by 280 micrometers of thickness of an adhesives layer) which applied polyester system adhesives beforehand to the polyethylene terephthalate film with a thickness of 100 micrometers as an exaggerated sheet 152,153, hot press was carried out to both sides of this core sheet, and it considered as the card base to them. In addition, the crevice which carries out invagination of the magnetic display beforehand was formed in the exaggerated sheet by the side of a front face. The card thickness after a press was set to 0.76mm.

[0046] as a magnetic display 111, flake-like barium ferrite magnetism powder (particle size of 6 micrometers) is distributed to the vehicle which consists of ethyl cellulose and an alcoholic solvent -- making -- microcapsule 114m ---izing -- the bottom. This was applied so that it might become 100 micrometers in thickness about polyvinyl alcohol on polyethylene terephthalate film base material 112 front face with a thickness of 80 micrometers which formed the coloring layer 113 black as a binder, and it was made into the magnetic display 111. Besides, the polyester film protective layer 116 with a thickness of 30 micrometers was formed through the glue line 115, and the magnetic display 111 was completed. The magnetic display 111 \*\* concerned was inserted in the crevice of the aforementioned noncontact IC card 10.

[0047] The hotel visitor was made to carry the noncontact IC card 10 with a display function made as an experiment by the <operation [ of a hotel service system ] test> above, and the operation trial was performed. In addition, the Dai Nippon Printing Co., Ltd. make (MCP200ZD) was used for the reader writer of a magnetic display. First, data, such as a visitor name, a cabin number, and the content of stay, were inputted into the noncontact IC card with the card issuance equipment 95 of a front, and the clear display was obtained when written in and displayed on IC card 10. When a visitor approached the door scanner of a cabin number, the door scanner 22 concerned has recognized the cabin number of IC card 10, and the door lock was canceled. When a visitor passed the door scanner 22 first, it was transmitted to the host computer and cabin entrance-into-a-room time of day was recorded on the database 102 of a host computer.

[0048] It totaled per a visitor's cabin number, the body 101 of a host computer performed total operation of the activity amount of money, and the settlement of accounts of a tariff to the activity amount of money stored it in the database 102 by using the result as visitor data. At the time of check-out, the visitor showed the front the noncontact IC card 10 with display capabilities, the comparison with the data of a host computer 100 was made, the toll has been recognized, the accumulating-totals point was considered, and settlement of accounts of a tariff was performed.

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[Translation done.]



## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the whole block diagram showing the hotel service system of this invention.

[Drawing 2] It is drawing showing the data communication system in a hotel service system.

[Drawing 3] It is the top view showing the noncontact IC card with a display function which a visitor carries.

[Drawing 4] It is the sectional view showing the noncontact IC card with a display function which a visitor carries.

[Drawing 5] It is the block diagram showing the circuitry of IC chip.

[Drawing 6] It is drawing showing the cross section of a magnetic display selectively.

[Drawing 7] It is drawing explaining the display condition of a magnetic display.

[Drawing 8] It is drawing showing the cross section of a heat record display selectively.

[Drawing 9] It is drawing showing an example of the property of a reversibility thermal recording ingredient.

[Drawing 10] It is the example which shows the content of a display displayed on a display.

[Description of Notations]

10 Noncontact IC Card with Display Function

11 Rewritable Display

12 IC Chip

13 Data Transceiver Section

14 Thin Cell

15 Base Material

18 Crevice

20 Cabin Terminal Unit

30 Restaurant Terminal Unit 40 Canteen Terminal Unit

50 Lounge Terminal Unit 60 Facility Terminal Units, Such as Pool

70 Cooperation Store and Cooperation Facility Terminal Unit

90 Front

91 Personal Computer

95 Card Issuance Equipment

22 Door Scanner

32, 42, 52, 62, 72 Scanner

23, 33, 43, 53, 63, 73, 93, 103 Transceiver machine

34, 44, 54, 64, 74, 94 POS register

35, 45, 55, 65, 75, 95 Reader writer

100 Host Computer

101 Body of Computer

102 Database

110 Data Circuit

121 Power Circuit 122 Clock Extract Circuit

123 Demodulator 124 Processing Circuit

125 Modulator 126 Memory

111 Magnetic Display

211 Heat Record Display

112, 212 Substrate

113, 213 Coloring layer

114, 214 Display layer

115, 215 Glue line

116, 216 Protective layer

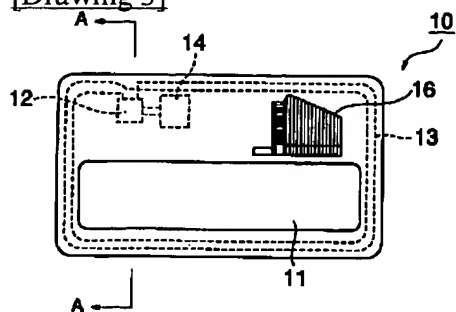
117a Magnetic powder

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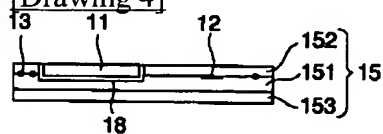
[Translation done.]

## DRAWINGS

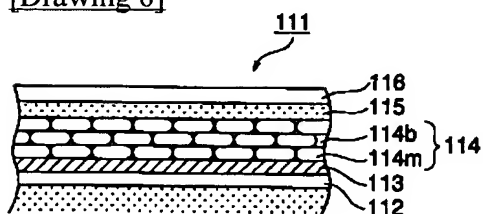
[Drawing 3]



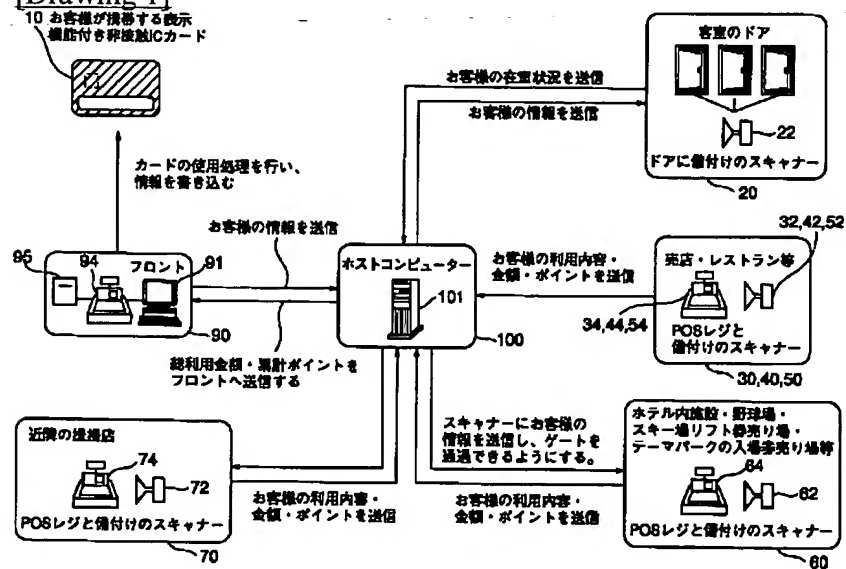
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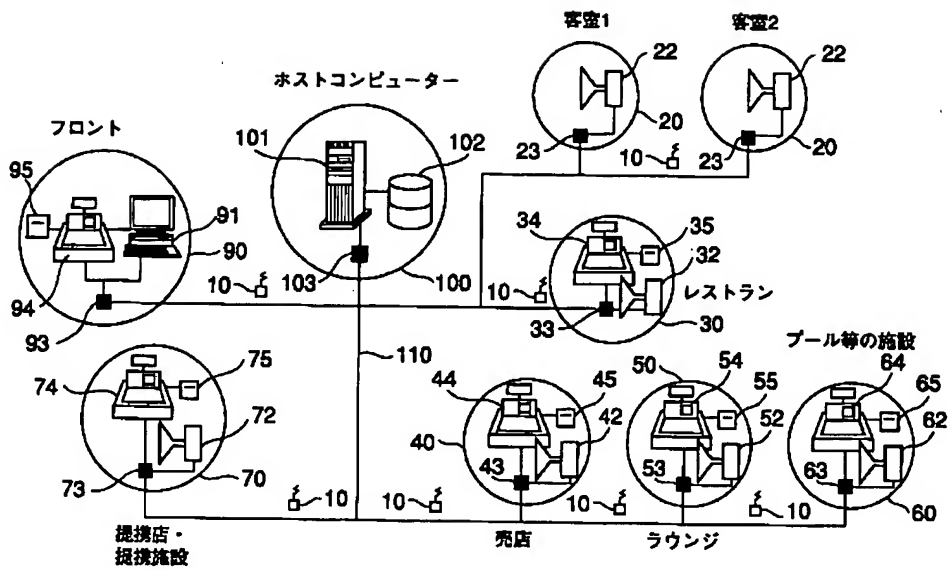
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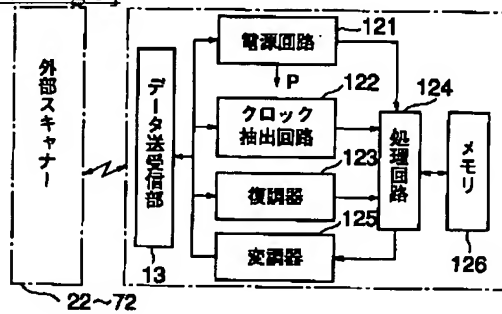
[Drawing 1]



[Drawing 2]

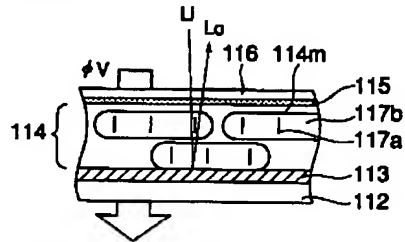


[Drawing 5]

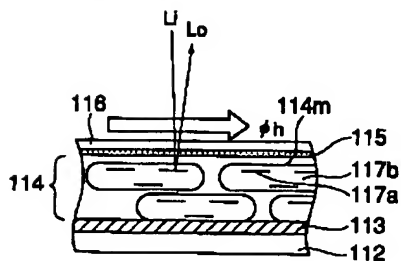


[Drawing 7]

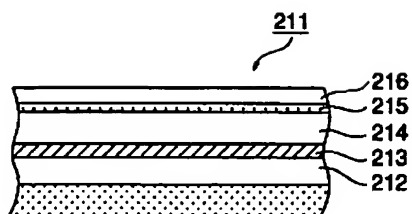
(A)



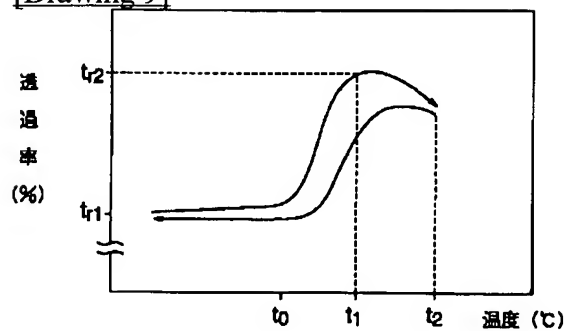
(B)



[Drawing 8]



[Drawing 9]



[Drawing 10]

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客室 No.	1018	累計ポイント	○○○
利用金額	5000円	合計金額	25000円
予約内容	×××	座席 No.	△△△

[Translation done.]